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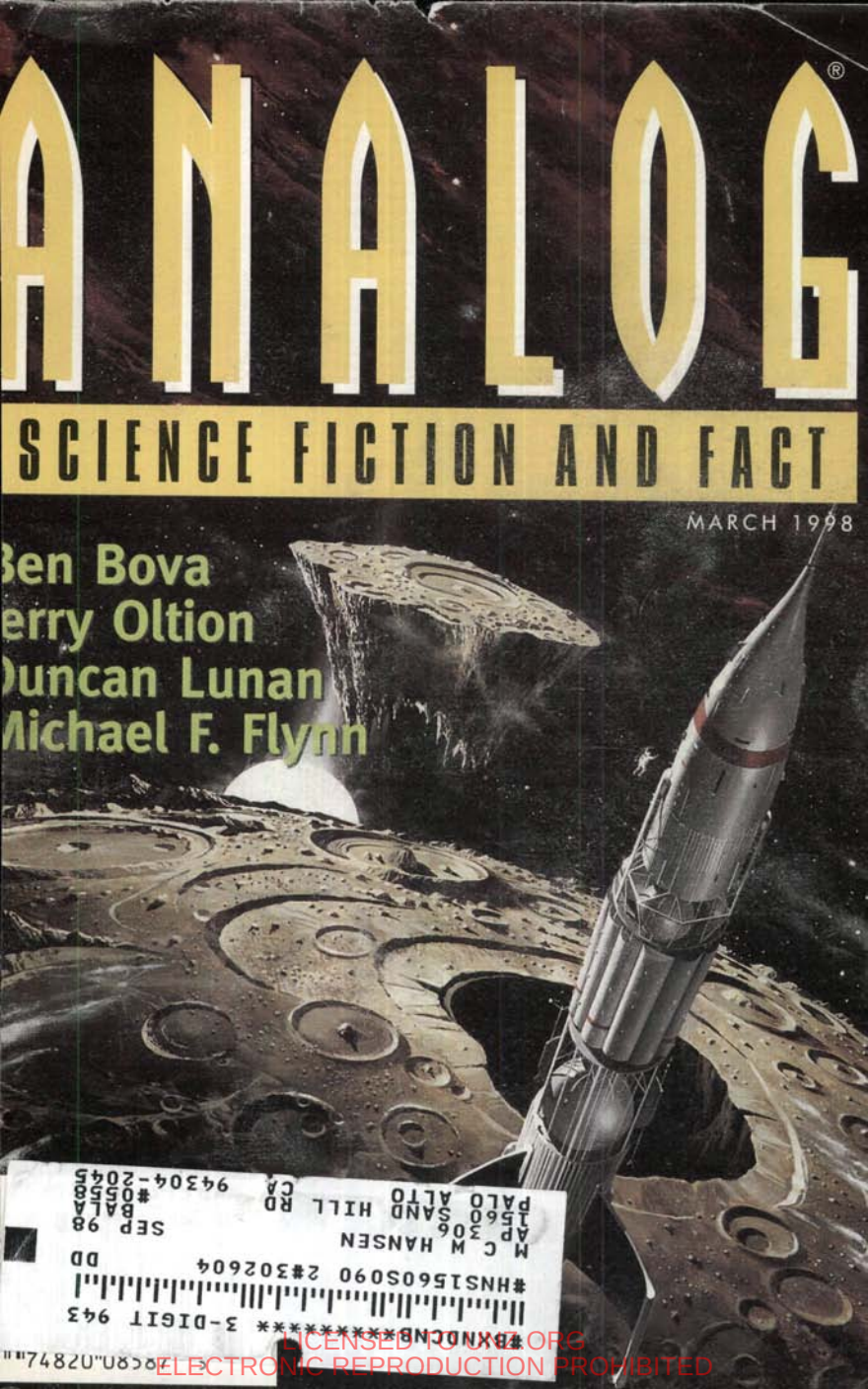

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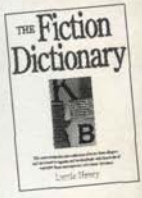

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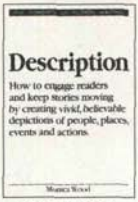

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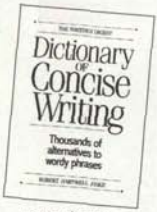

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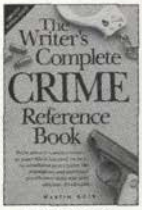

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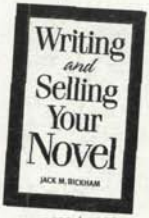

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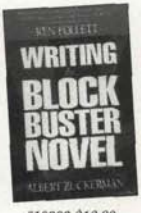

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78 12

Vol. CXVIII No. 3
March 1998

Next Issue on Sale
March 3, 1998

Novella
TOURIST SAM, Ben Bova ____ 12

Novelettes
TRAMP, David Alexander ____ 94
RULES OF ENGAGEMENT, Michael F. Flynn ____ 132

Science Fact
EPSILON BOÖTIS REVISITED, Duncan Lunan ____ 52

Short Stories
WHY DIDN'T YOU THINK OF THAT BEFORE WE LEFT? Jerry Oltion ____ 69
THE STONES FROM WHICH MEADOWS GROW, Wolf Read ____ 78
IN LOCO PARENTIS, Edward H. Seksay ____ 120

Probability Zero
PECULIAR PLANTS, Mia Molvray ____ 114

Reader's Departments
THE EDITOR'S PAGE ____ 4
THE ALTERNATE VIEW, Jeffery D. Kooistra ____ 116
THE REFERENCE LIBRARY, Tom Easton ____ 147
IN TIMES TO COME ____ 10
BRASS TACKS ____ 154
UPCOMING EVENTS, Anthony Lewis ____ 160

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Indicia on Page 5

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EDITORIAL Stanley Schmidt

DEFENDERS OF THE FAITHS

As befits its name, *Analog Science Fiction and Fact* publishes, in a typical issue, at least one article of "science fact." But what does "science fact" mean?

In the strictest possible sense, and the one which some readers would clearly like us to use, it can be interpreted as "an unquestioned and unquestionably true statement about the nature of the universe." Unfortunately, there is little, if anything, that we actually know with that degree of certainty. Even if there were, many other readers (and I) would not want *Analog* to define the subject matter of its fact articles so narrowly.

In general, we're not interested in reviews of material so well established that it can be found in textbooks. Such stuff you might as well get *from* textbooks. As a magazine whose main focus is what the future might be like and how we can make it better, we are more interested in subjects on the frontiers of research. With only a dozen fact articles per year, we want to concentrate on things which readers are not likely to have read much about elsewhere and which seem likely to have far-reaching implications for the future.

That, of course, covers a broad range. Some of our articles are descriptions of new technologies or areas of scientific inquiry which are generally recognized as major developments within their fields. Some are about the processes of inquiry and innovation *per se*, or about their legal or social ramifications. And some are about "fringe" work: experiments or theories that would have considerable impact if substantiated, but are currently controversial, sometimes even to the point of being rejected and sneered at by most workers in their fields.

Those bring us lots of letters. Many of those letters fall into one of two extreme camps, both of which miss the point of what the authors and the magazine are trying to do with such articles. So an occasional reminder may be in order. Just what *is* the point of such articles as Jeffery D. Kooistra's "Paradigm Shifty Things" (June 1997) and Dr. Eugene F. Mallove's "Cold Fusion: The 'Miracle' Is No Mistake" (July/August 1997)? Why do we publish them? What purpose do they serve?

To refresh your memory, or in case you missed them, Kooistra's article surveyed heretical work in fields (no pun intended) as diverse as gravitation, electromagnetism, and Egyptology.

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Mallove's concentrated on the specific area commonly (though perhaps not accurately) known as "cold fusion." Both cited references that readers could use to go back to the original work and evaluate it for themselves. Virtually all of those references were by people with the kind of credentials commonly accepted as strong evidence of professional competence, and in Mallove's case there were *dozens* of them.

Yet the mail followed the usual, predictable pattern (and precious little of it showed any evidence that the writers had even looked at the sources cited).

One group wrote to applaud the author for exposing how narrow-minded "The Scientific Establishment" is, or even for proving TSE "wrong." Members of this group often compare TSE to a religious priesthood, and sneer at "orthodox" scientists as "defenders of the faith."

The other "extreme" group, of course, is a subset of those "defenders of the faith" who actually do attack the "heretics" in a largely reflexive way, pointing out that generally accepted theories got that way through a long, hard process of repeatable experiments and peer review—and then dismissing out of hand the possibility that somebody might have found something not adequately covered by those theories. Such correspondents sometimes go on to attack *Analog* for being "antiscientific" for daring to publish such hogwash—a view I find ironically amusing since I am myself a scientist. (I left that line of work only because editing *Analog* sounded like too much fun to pass up; I have never ruled out the possibility of someday returning to it, and the advancement of scientific understanding has always remained one of my primary concerns.)

Both groups act like defenders of different faiths: in one case the faith that science already understands things so well that uncomfortable data must be wrong and can safely be ignored; in the other, the faith that science is "just another priesthood" and someday the downtrodden underdogs of independent research will prove the scientific priests wrong.

In fact, *both* groups are wrong in important ways. Both could use reminders of important facts about how science actually develops—and how they can best contribute to that development.

Science is *not* "just another priesthood," or just a matter of faith. It rests on a foundation of accumulated data

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and critical analysis, and generally accepted scientific theories usually do have a lot of validity in that they describe the data to date more completely and accurately than other theories that have been proposed. The authors of most of our "heretical" articles understand that (those of the two articles I used as examples are scientists themselves), and critics who attack them by pointing it out are simply poking at straw men and undermining their own credibility. Our authors seldom, if ever, deny that science works that way, or claim to prove that established theories are "all wrong."

They do, however, remind us that new observations sometimes turn up that are not adequately explained or predicted by the currently accepted theories, and that the theories must be revised, expanded, or replaced to account for them. That, too, is an important part of how science advances. An old theory seldom has to be scrapped entirely; if it was solidly based on one range of experience, the new theory must give the same predictions as the old in the range of experience where the old theory worked. Newtonian physics, for example, remains a useful model for slow-moving, macroscopic objects, even though those cases are equally well (but less conveniently) described by relativity and quantum mechanics. But observations on very small and/or fast-moving objects *require* the additional subtleties of relativity and quantum mechanics, and those theories are based on a radically different worldview than Newtonian mechanics. People who forget that new data sometimes require new theories are just as wrong as those who forget that science is based on evidence, not blind faith.

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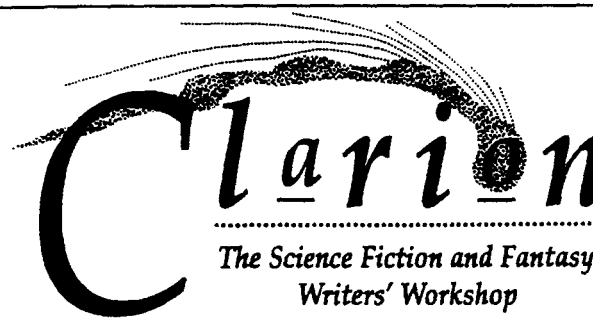

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The more perceptive of those who write to attack our "heretics" sometimes point out that, with the sheer volume of information being generated these days, few scientists can afford to spend much time looking closely at work which appears unlikely to withstand scrutiny. This is quite true, and a real problem; yet you can't really be *sure* what will withstand scrutiny unless and until you scrutinize it. I addressed this dilemma years ago, in an editorial called "Advice for 'Crackpots'" (*Analog,* October 1980), wherein I explained the situation from a professional scientist's viewpoint and made concrete suggestions as to how a proponent of an unorthodox but meritorious view might enhance his or her chances of getting a serious reading.

On the other hand, the fact remains that science is done by human beings, and for some of them the dismissal of the unorthodox as "not worth my time" has become so automatic that it's practically impossible to get them to seriously consider *any* unorthodox work. This, too, is understandable; if you've seen enough letters from people who claim they've disproved relativity, but who soon make it painfully clear that they don't even understand what relativity *says*, it becomes harder and harder to approach yet another such letter with an open mind. Yet it will occasionally be crucial to the advancement of science to do exactly that. Obviously *everybody* can't listen attentively and mull over *every* unorthodox suggestion. But the whole point of scientific publication is to get new data and ideas out so that, somewhere among the many potential readers, they may find a few who latch onto them and check them out.

Several people who wrote about our latest "heretical" articles objected to what they saw as stridency of tone (which can indeed be counterproductive), and reminded us that if an odd new observation is real enough, it will eventually assert itself so insistently that it can no longer be ignored and theories will *have* to revised to accommodate it. *But that can't happen* if a particular kind of new observation is systematically blacklisted so that it *isn't* repeatedly called to the appropriate people's attention. That *can* happen, and there is at least some evidence that it has happened in the case of "cold fusion."

According (for example) to Edmund Storms's article in the May/June 1994 *Technology Review* (on which I commented in my January 1995 editorial), the US Patent Office has categorically stopped issuing patents in that area, the Department of Energy has stopped funding research in it, and "conventional" journals refuse even to consider papers in it. Work in it continues, at what seems to be a large number of quite respectable labs, but has to be published in a very few special journals that are largely regarded as a "ghetto" and not taken seriously by those not in that ghetto. It may be that, if the effects they're studying are real, they'll eventually be heard even outside; but there is also a danger that the ghetto will be so effectively fenced off that a potentially revolutionary field will never have a chance to grow up.

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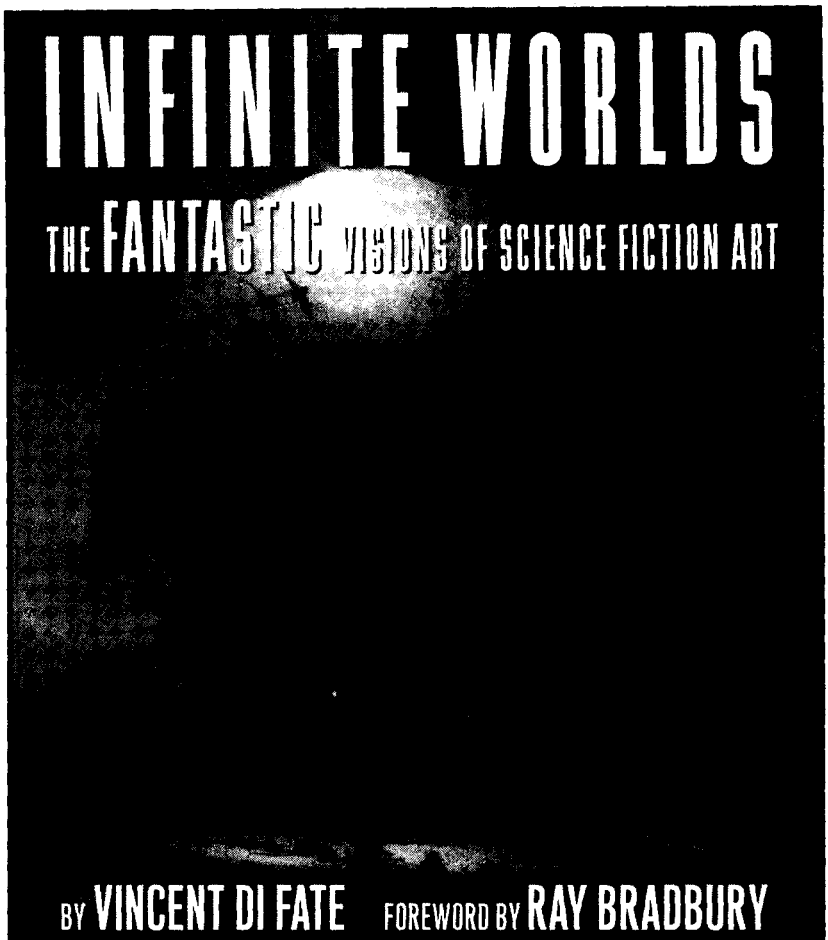

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That is why *Analog* occasionally publishes articles about such things. We are, at heart, a speculative magazine, and our readers include many scientists and engineers—some of them considerably above average in their openness to considering "heresies." Yes, it is important for us to tell you about some of the most important new work that is generally accepted. But we consider it just as important to tell you about some of the work that's having trouble getting heard in conventional professional journals, but looks as if it just might pan out and prove important. Much of it won't, of course; but some of it may. And someone who saw it here just may play a key role in making that happen. ■

IN TIMES TO COME

Back in August 1995, Joan Slonczewski, well known for her strongly humanistic yet strongly biology-based novels (under her other hat, she's a professional biologist) made her first *Analog* appearance with the short story "Microbe." That story, as it turns out, was a "sneak preview" of Prokaryon, a world with a native ecosystem based on a highly unusual *kind* of biology, into which humans could fit only with sophisticated technological aids. In our April issue (and the three to follow), Dr. Slonczewski takes us back to Prokaryon more than a century later in *The Children Star*, her first *Analog* serial. Humans now have an established presence on Prokaryon, but still don't understand some very basic things about it. And the answers to those mysteries are not only surprising, but have profound implications for everybody and everything that lives there. . . .

Our April science fact article is also biological and also Part 1 of a "serial." The authors are H. G. Stratmann (M.D.) and G. David Nordley and the subject is biological hazards and medical care in space—a subject so big that it will take them two months to cover it!

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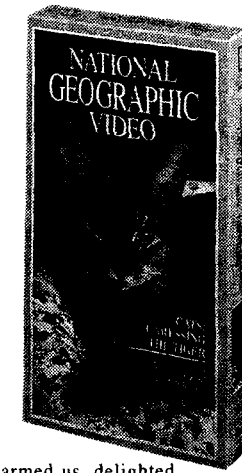

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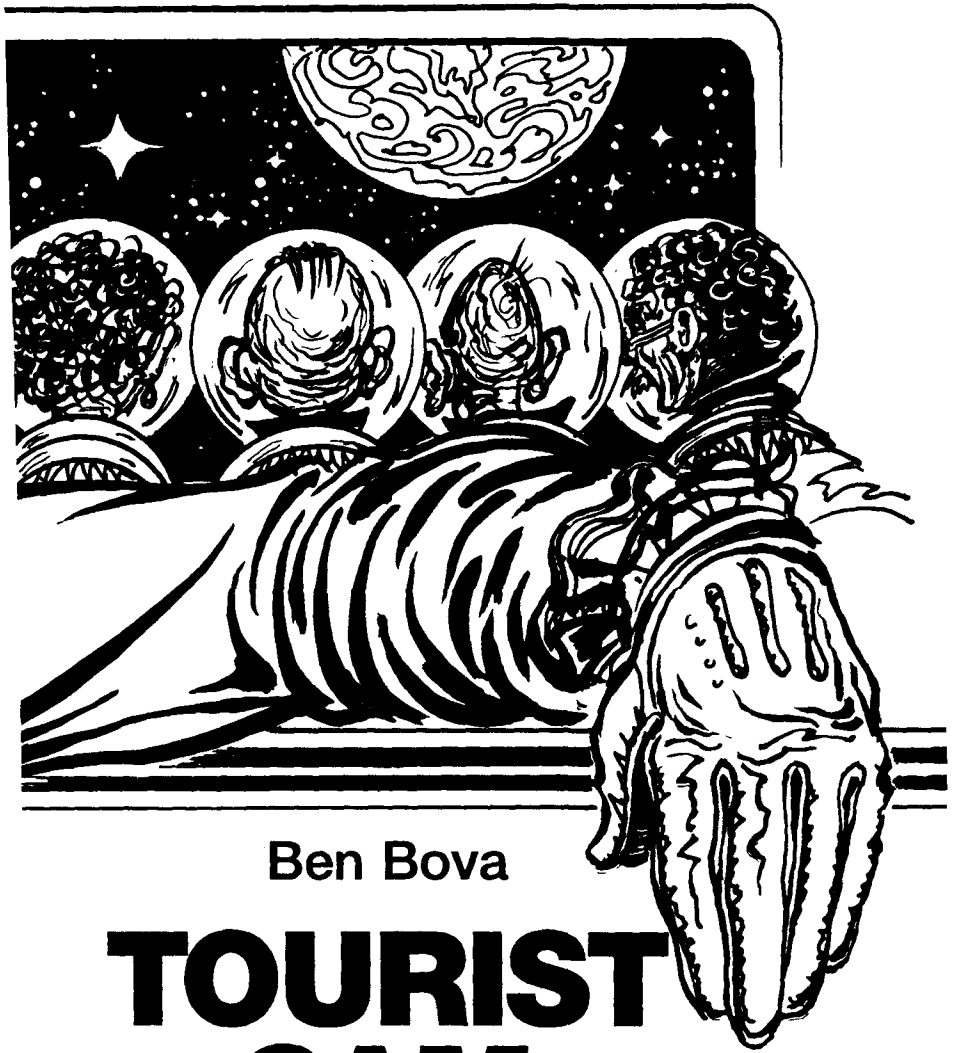

Ben Bova

TOURIST SAM

There's more than one way . . .
and leave it to Sam to find it!

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Why did NASA fire Sam Gunn? It'd be better to ask why we didn't fire the little S.O.B. out of a cannon and get rid of him once and for all. Would've been a service to the human race.

I'm no detective, but I smelled a rat when Sam put in a formal request for a three-month leave of absence. I just stared at my desktop screen. Sam Gunn, going through regular channels? Something was fishy. I mean, Sam *never* did things according to regulations. Give him a road map with a route on the interstates plotted out by AAA and he'd go down every dirt road and crooked alley he could find, just to drive my blood pressure up to the bursting point.

Trouble was, the sawed-off little runt was a damned good astronaut. About as good as they come, as a flyer and ingenious troubleshooter. Like the time he saved the lunar mission by jury-rigging a still and getting all the stranded astronauts plastered so they'd be unconscious most of the time and use up less oxygen.

That was typical of Sam Gunn. A hero who left the rules and regulations in a shambles every time.

He had just come off his most notorious stunt of all—getting the first skipper of space station *Freedom* to punch the abandon ship alarm and then riding back down to Earth in an emergency escape capsule with some young woman from a movie studio. He had to be hospitalized after they landed; he claimed it was from stress during re-entry, but everybody at the Cape was wondering who was re-entering what.

Anyway, there was his formal request for a three-month leave of absence, all filled out just as neat and precise as I would have done it myself. He was certainly entitled to the leave. But I knew Sam. Something underhanded was going on.

I called him into my office and asked him point-blank what he was doing. A waste of time.

"I need a rest," he said. Then he added, "Sir."

Sam's face was as round and plain as a penny, and his wiry hair was kind of coppery color, come to think of it. Little snub of a nose with a scattering of freckles. His teeth had enough spaces between them so that he reminded me of a Jack-o-lantern when he grinned.

He wasn't grinning as he sat in front of my desk. He was all perfectly polite earnestness, dressed in a *tie* and a real suit, like an honest-to-Pete straight-arrow citizen. His eyes gave him away, though: they were as crafty as ever, glittering with visions that he wanted to keep secret from me.

"Going anyplace special?" I asked, trying to make it sound nonchalant.

Sam nonchalanted me right back. "No, not really. I just need to get away from it all for a while."

Yeah, sure. Like Genghis Khan just wanted to take a little pony ride.

I had no choice except to approve his request. But I had no intention of letting the sneaky little sumbitch pull one over on me. Sam was up to something; I knew it, and the glitter in his eyes told me that he knew I knew it.

As I said, I'm no detective. So I hired one. Well, she really wasn't a detective.

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My niece, Ramona Perkins, was an agent with the Drug Enforcement Agency—a damned stupid name, if you ask me. Makes it sound like the government is *forcing* people to do drugs.

Well, anyway, Ramona wasn't too thrilled with the idea of trailing a furloughed astronaut for a few weeks.

"Yes, Uncle Griff, I have three weeks of vacation time coming, but I was going to wait until December and go to Alaska."

That was Ramona, as impractical as they come. She was pretty, in a youngish, girl-next-door way. Nice sandy-blonde hair that she always kept pinned up; made her look even younger than she was. And there was no doubt about her courage. Anybody who makes a career out of posing as an innocent kid and infiltrating drug gangs has more guts than brains, if you ask me.

She had just gone through a pretty rough divorce. No children, thank Pete, but her ex-husband made a big to-do about their house and cars. Seemed to me he cared more about their damned stereo and satellite TV set-up than he did about my niece.

I made myself smile at her image in my phone screen. "Suppose I could get you three weeks of detached duty, assigned to my office. Then you wouldn't use up any of your vacation time."

"I don't know. . . . " She sort of scrunched up her perky face. I figured she was trying to bury herself in her work and forget about her ex.

"It'd do you good to get away from everything for a while," I said.

Ramona's cornflower-blue eyes went curious. "What's so important about this one astronaut that you'd go to all this trouble?"

What could I tell her? That Sam Gunn had been driving me nuts for years and I was certain he was up to no good? That I was afraid Sam would pull some stunt that would reflect dishonorably on the space agency? That if and when he got himself in trouble the agency management would inevitably dump the blame on me, since I was in charge of his division?

I wasn't going to have Sam botch up my record, dammit! I was too close to retirement to let him ruin me. And don't think the little S.O.B. wasn't trying to do me dirt. He'd slit my throat and laugh about it, if I let him.

But to my sweet young niece, I merely said, "Ramona, this is a matter of considerable importance. I wouldn't be asking your help if it weren't. I really can't tell you any more than that."

Her image in my phone screen grew serious. "Does it involve narcotics, then?"

I took a deep breath and nodded. "That's a possibility." It was a lie, of course; Sam was as straight as they come about drugs. Wasn't even much of a drinker. His major vice was women.

"All right," she said, completely business-like. "If you can arrange the reassignment, I'll trail your astronaut for you."

"That's my girl!" I said, really happy with her. She'd always been my favorite niece. At that point in time it never occurred to me that sending her after Sam might put her in more

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danger than the entire Colombian cartel could throw at her.

The three weeks passed. No report from her. I began to worry. Called her supervisor at DEA and he assured me she'd been phoning him once a week, just to tell him she was OK. I complained that she should've been phoning me, so a few days later I got an e-mail message: EVERYTHING IS FINE BUT THIS IS GOING TO TAKE LONGER THAN WE THOUGHT.

It took just about the whole three damned months. It wasn't until then that Ramona popped into my office, sunburnt and weary-looking, and told me what Sam had been up to. This is what she told me:

I know this investigation took a lot longer than you thought it would, Uncle Griff. It was a lot more complicated than either one of thought it'd be. *Nothing* that Sam Gunn does is simple!

To begin with, by the time I started after him, Sam had already gone to Panama to set up the world's first space tourist line.

That's right, Uncle Griff. A tourist company. In Panama.

He called his organization Space Adventure Tours and registered it as a corporation in Panama. All perfectly legal, but it started alarm bells ringing in my head right from the start. I knew that Panama was a major drug-transshipment area, and a tourist company could be a perfect front for narcotics smuggling.

By the time I arrived in Colón, on the Caribbean side of the Panama Canal, Sam had established himself in a set of offices he rented on the top floor of one of the three-story stucco commercial buildings just off the international airport.

As I said, my first thought was that he was running a smuggling operation, probably narcotics, and his wild-sounding company name was only a front. I spent a week watching his office, seeing who was coming and going. Nobody but Sam himself and a couple of young Panamanian office workers. Now and then an elderly guy in casual vacation clothes or a silver-haired couple. Once in a while a blue-haired matronly type would show up. Seldom the same people twice. No sleazebags in five-hundred-dollar suits. No Uzi-toting maniacs of enforcers.

I dropped in at the office myself to look the place over. It seemed normal enough. An anteroom with a couple of tacky couches and armchairs, divided by a chest-high counter. Water stains on the ceiling tiles. On the other side of the counter sat the two young locals, a male and a female, both working at desktop computers. Beyond them was a single door prominently marked S. GUNN, PRESIDENT AND CEO.

Most smuggling operators don't put their own names on doors.

The young woman glanced up from her display screen and saw me standing at the counter. Immediately she came out from behind her desk, smiling brightly, and asked in local-accented English, "Can I help you?"

I put on my best Dorothy-from-Kansas look and said, "What kind of tours do you offer?"

"An adventure in space," she said, still smiling.

"In space?"

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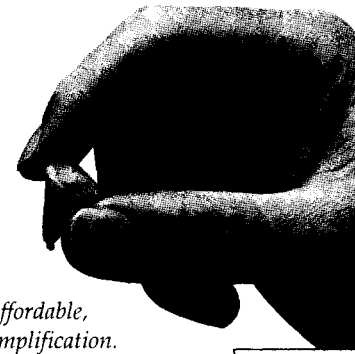

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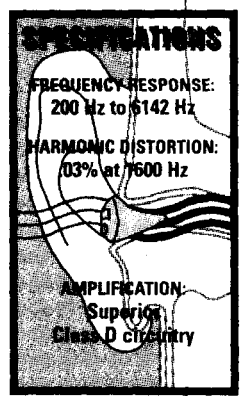

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"Yes. Like the astronauts."

"For tourists?"

"*Sí*—Yes. Our company is the very first in the world to offer a space flight adventure."

"In space?" I repeated.

She nodded and said, "Perhaps Mr. Gunn himself should explain it to you."

"Oh, no, I wouldn't want to bother him."

"No bother," she said sweetly. "He enjoys speaking to the customers."

She must have pressed a buzzer, because the S. GUNN door popped open and out walked Sam, smiling like a used-car salesman.

The first thing about him to strike me was how short he was. I mean, I'm barely five-five in my flats and Sam was a good two inches shorter than I. He seemed solidly built, though, beneath the colorful flowered short-sleeve shirt and sky blue slacks he was wearing. Good shoulders, a little thick in the midsection.

His face was, well . . . *cute*. I thought I saw boyish enthusiasm and charm in his eyes. He certainly didn't look like your typical drug lord.

"I'm Sam Gunn," he said to me, sticking his hand out over the counter. "At your service."

I got the impression he had to stand on tiptoe to get his arm over the counter.

"Ramona Perkins," I said taking his hand in mine. He had a firm, friendly grip. With my free hand I activated the microcassette recorder in my shoulder bag.

"You're interested in a space adventure?" Sam asked, opening the little gate at the end of the counter and ushering me through.

"I really don't know," I said, as if I were taking the first step on the Yellow Brick Road. "It all seems so new and different."

"Come into my office and let me explain it to you."

Sam's office was much more posh than the outer room. He had a big modernistic desk, all polished walnut and chrome, and two chairs in front of it that looked like reclinable astronaut's seats. I learned soon enough that they were reclinable, and Sam liked to recline in them with female companions.

No windows, but the walls were lined with photographs of astronauts hovering in space, with the big blue curving Earth as a backdrop. Behind Sam's desk, on a wide walnut bookcase, there were dozens of photos of Sam in astronaut uniform, in a spacesuit, even one with him in scuba gear with his arm around a gorgeous video starlet in the skimpiest bikini I've ever seen.

He sat me in one of the cushioned, contoured recliners and went around behind his desk. I realized there was a platform back there, because when Sam sat down he was almost taller than he had been standing up in front of the desk.

"Ms. Perkins . . . may I call you Ramona?"

"Sure," I said, in a valley-girl accent.

"That's a beautiful name."

"Thank you."

"Ramona, until now the thrill of flying in space has been reserved to a handful of professional astronauts like myself—"

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"Haven't some politicians and video stars gone into orbit?" I asked, with wide eyed innocence.

"Yes indeed they certainly have," Sam answered. "And if *they've* flown in space there's no good reason why *you* shouldn't have the experience, too. You, and anyone else who wants the adventure of a lifetime!"

"How much does it cost?" I asked.

Sam hiked his rust red eyebrows at me. And launched into a nonstop spiel about the beauties and glories and excitement of space travel. He wasn't really eloquent, that wasn't Sam's style. But he was persistent and energetic. He talked so fast and so long that it seemed as if he didn't take a breath for half an hour. I remember thinking that he could probably go out for an EVA space walk without oxygen if he put his mind to it.

For the better part of an hour Sam worked up and down the subject.

"And why shouldn't ordinary people, people just like you, be allowed to share in the excitement of space flight? The once-in-a-lifetime adventure of them all! Why do government agencies and big, powerful corporations refuse to allow ordinary men and women the chance to fly in space?"

I batted my baby blues at him and asked, in a breathless whisper, "Why?"

Sam heaved a big sigh. "I'll tell you why. They're all big bureaucracies, run by petty minded bureaucrats who don't care about the little guy. Big corporations like Rockledge could be running tourists into orbit right now, but their bean counting bureaucrats won't let that happen for fear that some tourist might get a little nauseous in zero gravity and sue the corporation when he comes back to Earth."

"Maybe they're afraid of an accident," I said, still trying to sound naive. "I mean, people have been killed in rocket launches, haven't they?"

"Not in years," Sam countered, waggling a hand in the air. "Besides, the launch system we're gonna use is super-safe. And gentle. We take off like an airplane and land like an airplane. No problems."

"But what about space sickness?" I asked.

"Likewise, no problem. We've developed special equipment that eliminates space sickness just about completely. In fact, you feel just as comfortable as you would in your own living room for just about the entire flight."

"Really?"

"Really," he said, with a *trust me* nod of his head.

"Wouldn't you be better off operating in the States?" I probed. "I mean, like, I just ran across your office kind of by accident while I was checking on my flight back home."

Sam scowled at me. "The U.S. government is wrapped up with bureaucrats and—worse—lawyers. You can't do *anything* new there anymore. If I tried to start a space tourist company in the States I'd have sixteen zillion bozos from NASA, OSHA, the Department of Transportation, the Commerce Department, the State Department, the National Institutes of Health

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and St. Francis of Assisi knows who-else coming down on my head. I'd be filling out forms and talking to lawyers until I was old and gray!"

"It's easier to get started in Panama, then."

"Much easier."

I sat there, gazing at Sam, pretending to think it all over.

Then I asked again, "How much does it cost?"

Sam looked at his wristwatch and said, "Hey! It's just about time for our first space cruiser to land! Let's go out and see it come in!"

I felt a little like the first time I went out to buy a car on my own, without Daddy or any of my big brothers with me. But I let Sam take me by the hand to his own car—a leased fire-engine red BMW convertible—and drive me out to an immense empty hangar with a newly-painted SPACE ADVENTURE TOURS sign painted across its curved roof.

"Used to be a blimp hangar," Sam said over the rushing wind as we drove up to the hangar. "U.S. Navy used 'em for anti-submarine patrol. It was falling apart from neglect. I got it for a song."

The DEA had considered asking the Navy to use blimps to patrol the sea lanes that drug smugglers used, I remembered.

"You're going into space in a blimp?" I asked as we braked to a gravel-spitting stop.

"No no no," Sam said, jumping out of the convertible and running over to my side to help me out. "Blimps wouldn't work. We're using . . . well, look! Here it comes now!"

I turned to look where he was pointing and saw a huge, lumbering Boeing 747 coming down slowly, with ponderous grace, at the far end of the long concrete runway. And attached to its back was a space shuttle orbiter.

"That's one of the old shuttles!" I cried, surprised.

"Right," said Sam. "That's what we ride into space in."

"Gosh." I was truly impressed.

The immense piggy-back pair taxied right up to us, the 747's four jet engines howling so loud I clapped my hands over my ears. Then it cut power and *loomed* over us, with the shuttle orbiter riding high atop it. It was certainly impressive.

"NASA sold off its shuttle fleet, so I got a group of investors together and bought one of 'em," Sam said, rather proudly, I noticed. "Bought the piggy-back plane to go with it, too."

While the ground crew attached a little tractor to the 747's nose wheel and towed it slowly into the old blimp hangar, Sam explained that he and his technical staff had worked out a new launch system: the 747 carries the orbiter up to more than fifty thousand feet, and then the orbiter disconnects and lights up its main engines to go off into space.

"The 747 does the job that the old solid rocket boosters used to do when NASA launched shuttles from Cape Canaveral," Sam explained to me. "Our system is cheaper and safer."

The word *cheaper* reminded me. "How much does a tour cost?" I asked still again, determined this time to get an answer.

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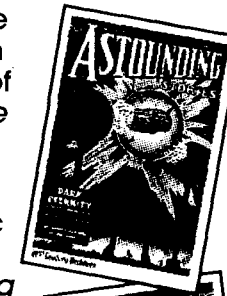

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We had walked into the hangar by now. Technicians were setting up ladders and platforms up and down the length of the plane. The huge shadowy hangar echoed with the clang of metal equipment and the clatter of their voices, yelling back and forth in Spanish.

"Want to go aboard?" Sam asked, with a sly grin.

I sure did, but I answered, "Not until you tell me how much a flight costs."

"Ten thousand dollars," he said, without flicking an eyelash.

"Ten thou . . . " I thought I recalled that the shuttle cost ten thousand dollars *a pound* when NASA was operating it. Even the new Clipperships, which were entirely reusable, cost several hundred dollars per pound.

"You can put it on your credit card," Sam suggested.

"Ten thousand dollars?" I repeated. "For a flight into orbit?"

He nodded solemnly. "You experience two orbits and then we land back here. The whole flight will last a little more than four hours."

"How can you do it so cheap?" I blurted.

Sam spread his arms. "I'm not a big, bloated government agency. I keep a very low overhead. I don't have ten zillion lawyers looking over my shoulder. My insurance costs are much lower here in Panama than they'd be in the States. And . . . " He hesitated.

"And?" I prompted.

With a grin that was almost bashful, Sam told me, "I want to do good for the people who'll never be able to afford space flight otherwise. I don't give a damn if I make a fortune or not: I just want to help ordinary people like you to experience the thrill and the wonder of flying in space."

I almost believed him.

In fact, right then and there I really *wanted* to believe Sam Gunn. Even though I had a pretty good notion that he was laying it on with a trowel.

I told Sam that even though ten thousand was a bargain for orbital flight it was an awfully steep price for me to pay. He agreed and invited me to dinner. I expected him to keep up the pressure on me to buy a ticket, but Sam actually had other things in mind. One thing, at least.

He was charming. He was funny. He kept me laughing all through the dinner we had at a little shack on the waterfront that served the best fish in onion sauce I've ever tasted. He told me the story of his life, several times, and each time was completely different. I couldn't help but like him. More than like him.

Sam drove me back to my hotel and rode up the creaking elevator with me to my floor. I intended to say goodnight at the door to my room but somehow it didn't work out that way. I never said goodnight to him at all. What I said, much later, was good morning.

Now, Uncle Griff, don't go getting so red in the face! It was the first time I'd let anybody get close to me since the divorce. Sam made me feel attractive, wanted. I needed that. It was like . . . well, like I'd run away from the human race. Sam brought me back, made me alive again. He was thoughtful and gentle and somehow at the

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same time terrifically energetic. He was great fun.

And besides, by the time we were having breakfast together in the hotel's dining room he had offered to let me fly on his space cruiser for free.

"Oh no, Sam, I couldn't do that. I'll pay my own way," I said.

He protested faintly, but I had no intention of letting him think I was in his debt. Going to bed with Sam once was fun. Letting him think I *owed* him was not.

So I phoned Washington and told my boss to expect a ten-grand charge to come through—which you, Uncle Griff, will be billed for. Then I got into a taxi and drove out to the offices of Space Adventure Tours and plunked down my credit card.

Sam took me to lunch.

But not to dinner. He explained over lunch that he had a business conference that evening.

"This space tour business is brand new, you gotta understand," he told me, "and that means I have to spend most of my time wining and dining possible customers."

"Like me," I said.

He laughed, but it was bitter. "No, honey, not like you. Old folks, mostly. Little old widows trying to find something interesting to do with what's left of their lives. Retired CEOs who want to think that they're still on the cutting edge of things. They're the ones with the money, and I've got to talk forty of 'em out of some of it."

"Forty?"

"That's our orbiter's passenger capacity. Forty is our magic number. For the next forty days and forty nights I'm gonna be chasing little old ladies and retired old farts. I'd rather be with you, but I've gotta sell those seats."

I looked rueful and told him I understood. After he left me back at my hotel, I realized with something of a shock that I really was rueful. I missed Sam!

So I trailed him, telling myself that it was stupid to get emotionally involved with the guy I'm supposed to be investigating. Sam's business conference turned out to be a dinner and show at one of Colón's seamier night clubs. I didn't go in, but the club's garish neon sign. ***The Black Hole***, was enough for me to figure out what kind of a place it was. Sam went in with two elderly gentlemen from the States. To me they looked like middle-class retired businessmen on a spree without their wives.

Sure enough, they were two more customers, I found out later.

Sam was busy most evenings, doing his sales pitch to potential customers over dinners and night club shows. He squired blue-haired widows and played tour guide for honeymooning couples. He romanced three middle-aged woman on vacation from their husbands, juggling things so well that the first time they saw one another was at the one-day training seminar in Sam's rented hangar.

It didn't quite take forty days and forty nights, but Sam gave each of his potential customers the full blaze of his personal attention. As far as I know, each and every one of them signed on the dotted line.

And then he had time for me again.

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I had extended my stay in Colón, waiting for the flight that Sam promised. Once he had signed up a full load of paying customers, he brought us all out to the hangar for what he called an "orientation."

So there we were, forty tourists standing on the concrete floor of the hangar with the big piggy-back airplane *cum* orbiter looming in front of us like a freshly-painted aluminum mountain. Sam stood on a rusty, rickety metal platform scrounged from the maintenance equipment.

"Congratulations," he said to us, his voice booming through the echo chamber of a hangar. "You are the very first space tourists in the history of the world."

Sam didn't need a megaphone. His voice carried through to our last row with no problem at all. He started off by telling us how great our flight was going to be, pumping up our expectations. Then he went on to what he said were the two most important factors.

"Safety and comfort," he told us. "We've worked very hard to make absolutely certain that you are perfectly safe and comfortable throughout your space adventure."

Sam explained that for safety's sake we were all going to have to wear a full space suit for the whole four-hour flight. Helmet and all.

"So you can come in your most comfortable clothes," he said, grinning at us. "Shorts, T-shirts, whatever you feel happiest in. We'll all put on our space suits right here in the hangar before we board the orbiter."

He explained, rather delicately, that each suit was equipped with a waste disposal system, a sort of high-tech version of the pilot's old relief tube, which worked just as well for women as it did for men.

"Since our flight will be no more than four hours long, we won't need the FCS—fecal containment system—that NASA's brainiest scientists have developed for astronauts to use." And Sam held up a pair of large-sized diapers.

Everybody laughed.

"Now I'm sure you've heard a great deal about space sickness," Sam went on, once the laughter died away. "I want to assure you that you won't be bothered by the effects of zero gravity on this flight. Your space suits include a special anti-sickness system that will protect you from the nausea and giddiness that usually hits first-time astronauts."

"What kind of a system is it?" asked one of the elderly men. He looked like a retired engineer to me: shirt pocket bristling with ball-point pens.

Sam gave him a sly grin. "Mr. Artumian, I'm afraid I can't give you any details about that. It's a new system, and it's proprietary information. Space Adventure Tours has developed this equipment, and as soon as the major corporations learn how well it works they're going to want to buy, lease, or steal it from us."

Another laugh, a little thinner than before.

"But how do we know it'll work?" Artumian insisted.

Very seriously, Sam replied, "It's been thoroughly tested, I assure you."

"But we're the first customers you're trying it on."

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Sam's grin returned. "You're the first customers we've had!"

Before Artumian could turn this briefing into a dialogue, I spoke up. "Could you tell us what we'll feel when we're in zero gravity? Give us an idea of what to expect?"

Sam beamed at me. "Certainly, Ms. Perkins. When we first reach orbit and attain zero *g*, you'll feel a moment or two of free-fall. You know, that stomach-dropping sensation you get when an elevator starts going down. But it'll only last a couple of seconds, max. Then our proprietary anti-disequilibrium system kicks in and you'll feel perfectly normal."

Artumian muttered "Ah-hah!" when Sam used the term anti-disequilibrium system, as if that meant something to his engineer's brain.

"Throughout the flight," Sam went on, "you may feel a moment now and then of free-fall, kind of like floating. But our equipment will quickly get your body's sensory systems back to normal."

"Sensory systems," Artumian muttered knowingly.

Sam and two people in flight attendants' uniforms showed us through the orbiter's passenger cabin. The attendants were both really attractive: a curvaceous little blonde with a megawatt smile and a handsome brute of a Latino guy with real bedroomy eyes.

We had to climb a pretty shaky metal ladder to get up there because the orbiter was still perched on top of the 747. The plane and the orbiter were gleaming with a fresh coat of white paint and big blue SPACE ADVENTURE TOURS running along their sides. But the ladder was flaking with rust.

It made me wonder just what kind of shoestring Sam was operating on: this big airplane with a NASA surplus space shuttle orbiter perched atop it, and we all had to clamber up this rusty, clattery ladder. Some of Sam's customers were pretty slow and feeble; old, you know. I heard plenty of wheezing going up that ladder.

The orbiter's cabin, though, was really very nice. Like a first-class section aboard an airliner, except that the seats were even bigger and more plush. Two seats on either side of the one central aisle. I saw windows at each row, but they were covered over.

"The windows are protected by individual opaque heat shields," Sam explained. "They'll slide back once we're in orbit so you can see the glories and beauties of Earth and space."

There were no toilets in the cabin, and no galley. The passengers would remain strapped into their seats at all times, Sam told us. "That's for your own safety and comfort," he assured us.

"You mean we won't get to float around in zero gravity like they do in the videos?" asked one of the elderly women.

"'Fraid not," Sam answered cheerfully. "Frankly, if you tried that, you'd most likely get so sick you'd want to upchuck. Even our very sophisticated anti-disequilibrium equipment has its limitations."

I wasn't close enough to hear him, but I saw Artumian's lips mouth the word, "Limitations."

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That evening all forty of us, plus Sam, had a festive dinner together on the rooftop of the local Hyatt Hotel. It was a splendid night, clear and filled with stars. A crescent Moon rose and glittered on the Caribbean for us.

Sam flitted from table to table all through the dinner; I doubt that he got to swallow more than a few bites of food. But he ended the evening at my table and drove me to my hotel himself, while all the other customers rode to their hotels in a rattletrap gear-grinding, soot-puffing big yellow school bus that Sam had rented.

"Tomorrow's the big day," Sam said happily as we drove through the dark streets. "Space Adventure's first flight."

My romantic interest in Sam took a back seat to my professional curiosity.

"Sam," I asked over the rush of the night wind, "how can you make a profit if you're only charging ten thousand per passenger? This flight must cost a lot more than four hundred thousand dollars."

"Profit isn't everything, my blue-eyed space beauty," he said, keeping his eyes on his driving.

"But if it costs more to fly than you make from ticket sales you'll go out of business pretty quickly, won't you?"

He shot a glance at me. "My pricing schedule is pretty flexible. You got the bargain rate. Others are paying more; a lot more."

"Really?"

"Uh-huh. That's another reason I'm operating here in Panama. Let the fat cats open their wallets wider than ordinary folks. If I tried that in the States I'd have a ton of lawyers hitting me with discrimination suits."

I thought about that as we pulled up in front of my hotel.

"Then how much will you make from this flight?" I asked, noticing that Sam kept the motor running.

"Gross? About a million-two."

"Is that enough to cover your costs?"

Sam grinned at me. "I won't go bankrupt. It's like the old story of the tailor who claims that he sells his clothing at prices *below* his own costs. 'On each and every individual sale we lose money,' he tells a customer. 'But on the volume we make a modest profit.'"

I didn't see anything funny in it. It didn't make sense.

Suddenly Sam shook me out of my musing. He grabbed me by the shoulders, kissed me on the lips, and then announced, "I'd love to go up to your room and make mad, passionate love to you, Ramona, but I've got an awful lot to do between now and takeoff tomorrow morning. See you at the hangar!"

He leaned past me and opened my door. Kind of befuddled, I got out of the car and waved good-bye to him as he roared off in a cloud of exhaust smoke.

Alone in my room, I started to wonder if our one night of passion had merely been Sam's way of closing the sale.

The next day, Space Adventure Tours's first flight was just about everything Sam had promised.

All forty of us gathered at the hangar bright and early. It took nearly two hours to get each of us safely sealed up

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inside a space suit. Some of the older tourists were almost too arthritic to get their creaky arms and legs into the suits, but somehow—with Sam and his two flight attendants pushing and pulling—they all managed.

Instead of that rickety ladder Sam drove a cherry picker across the hangar floor and lifted us in our spacesuits, two by two like Noah's passengers, up to the hatch of the orbiter. The male attendant went up first and was there at the hatch to help us step inside the passenger cabin and clomp down the aisle to our assigned seats.

Sam and I were the last couple hoisted up. With the visor of my suit helmet open, I could smell the faint odor of bananas in the cherry picker's cab. It made me wonder where Sam had gotten the machine, and how soon he had to return it.

After we were all strapped in, Sam came striding down the cabin, crackling with energy and enthusiasm. He stood up at the hatch to the flight deck and grinned ear-to-ear at us.

"You folks are about to make history. I'm proud of you," he said. Then he opened the hatch and stepped into the cockpit.

Three things struck me, as I sat strapped into my seat, encased in my spacesuit. One: Sam didn't have to duck his head to get through that low hatch. Two: he wasn't wearing a spacesuit. Three: he was probably going to pilot the orbiter himself.

Was there a co-pilot already in the cockpit with him? Surely Sam didn't intend to fly the orbiter into space entirely by himself. And why wasn't he wearing a spacesuit, when he insisted that all the rest of us did?

No time for puzzling over it all. The flight attendants came down the aisle, checking to see that we were all firmly strapped in. They were in spacesuits, just as were we. I felt motion: the 747 beneath us was being towed out of the hangar. The windows were sealed shut, so we couldn't see what was happening outside.

Then we heard the jet engines start up; actually we felt their vibrations more than heard their sound. Our cabin was very well insulated.

"Please pull down the visors on your helmets," the blonde flight attendant sing-songed. "We will be taking off momentarily."

I confess I got a lump in my throat as I felt the engines whine up to full thrust, pressing me back in my seat. With our helmet visors down I couldn't see the face of the elderly woman sitting beside me, but we automatically clasped our gloved hands together, like mother and daughter. My heart was racing.

I wished we could see out the windows! As it was, I had to depend on my sense of balance, sort of flying by the seat of my pants, while the 747 raced down the runway, rotated its nose wheel off the concrete, and then rose majestically into the air—with us on top of her. Ridiculously, I remembered a line from an old poem: *With a sleighful of toys and St. Nicholas, too.*

"We're in the air," came Sam's cheerful voice over our helmet earphones. "In half an hour we'll separate from our carrier plane and light up our main rocket engines."

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We sat in anticipatory silence. I don't know about the others—it was impossible to see their faces or tell what was going through their minds—but I twitched every time the ship jounced or swayed.

"Separation in two minutes," Sam's voice warned us.

I gripped my seat's armrests. I couldn't see my hands through the thick spacesuit gloves, but I could feel how white my knuckles were.

"You're going to hear a banging noise," Sam warned us. "Don't be alarmed; it's just the explosive bolts separating the struts that're clamping us to the carrier plane."

Explosive bolts. All of a sudden I didn't like that word *explosive*.

The bang scared me even though I knew it was coming. It was a really loud, sharp noise. But the cabin didn't seem to shake or shudder at all, thank goodness.

Almost immediately we felt more thrust pushing us back into our seats again.

"Main rocket engines have ignited on schedule," Sam said evenly. "Next stop, LEO!"

I knew that he meant Low Earth Orbit, but I wondered how many of the tourists were wondering who this person Leo might be.

The male flight attendants' voice cut in on my earphones. "As we enter Earth orbit you will experience a few moments of free-fall before our antidisequilibrium equipment balances out your inner sensory systems. Don't let those few moments of a falling sensation worry you; they'll be over almost before you realize it."

I nodded to myself inside my helmet. Zero *g*. My mouth suddenly felt dry.

And then I was falling! Dropping into nothingness. My stomach floated up into my throat. I heard moans and gasps from my fellow tourists.

And just like that it was over. A normal feeling of weight returned and my stomach settled back to where it belonged. Sam's equipment really worked!

"We are now in low Earth orbit," Sam's voice said, low, almost reverent. "I'm going to open the viewport shutters now."

Since I had paid the lowest price for my ride, I had an aisle seat. I leaned forward in my seat harness and twisted my shoulders sideways as far as I could so that I could peer through my helmet visor and look through the window.

The Earth floated below us, huge and curving and so brightly blue it almost hurt my eyes. I could see swirls of beautiful white clouds and the sun gleaming off the ocean and swatches of green ground and little brown wrinkles that must have been mountains and out near the curving sweep of the horizon a broad open swath of reddish tan that stretched as far as I could see.

"That's the coast of Africa coming up. You can see the Sahara a little to our north," Sam said.

The cabin was filled with gasps and moans again, but this time they were joyous, awestruck. I didn't care how much the ticket price was; I would have paid my own way to see this.

I could see the horn of Africa and the great rift valley where the first

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proto-humans made their camps. Sinbad's Arabian Sea glittered like an ocean of jewels before my eyes.

Completely around the world we went, not in eighty days but a little over ninety minutes. The Arabian peninsula was easy to spot, not a wisp of a cloud anywhere near it. India was half blotted out by monsoon storms but we swung over the Himalayas and across China. It was night on that side of the world, but the Japanese islands were outlined by the lights of their cities and highways.

"Mt. Everest's down there under the clouds," Sam told us. "Doesn't look so tall from up here."

Japan, Alaska, and then down over the heartland of America. It was an unusually clear day in the Midwest; we could see the Mississippi snaking through the nation's middle like a coiling blood vessel.

Twice we coasted completely around the world. It was glorious, fascinating, an endless vision of delights. When Sam asked us how we were enjoying the flight the cabin echoed with cheers. I didn't want the flight to end. I could have stayed hunched over in that cumbersome space suit and stared out that little window for the rest of my days. Gladly.

But at last Sam's sad voice told us, "I'm sorry, folks, but that's it. Time to head back to the barn."

I could feel the disappointment that filled the cabin.

As the window shutters slowly slid shut Sam announced casually, "Now comes the tricky part. Re-entry and rendezvous with the carrier plane."

Rendezvous with the carrier plane? He hadn't mentioned that before. I heard several attendant call buttons chiming. Some of the other tourists were alarmed by Sam's news, too.

In a few minutes he came back on the intercom. In my earphones I heard Sam explain, "Our flight plan is to rendezvous with the carrier plane and reconnect with her so she can bring us back to the airport under the power of her jet engines. That's much safer than trying to land this orbiter by herself.

"However," he went on, "if we miss rendezvous we'll land the orbiter just the way we did it for NASA, no sweat. I've put this ninety-nine ton glider down on runways at Kennedy and Edwards, no reason why I can't land her back at Colón just as light as a feather."

A ninety-nine ton feather, I thought, can't be all that easy to land. But reconnecting to the carrier plane? I'd never heard of that even being tried before.

Yet Sam did it, smooth as pie. We hardly felt a jolt or rattle. Sam kept up a running commentary for us, since our window shutters had been closed tight for re-entry into the atmosphere. There were a few tense moments, but only a few.

"Done!" Sam announced. "We're now connected again to the carrier plane. We'll be landing at Colón in twenty-seven minutes."

And that was it. I felt the thud and bounce of the 747's wheels hitting the concrete runway, and then we taxied back to the hangar. Once we stopped and the engines whined down, the flight attendants opened the hatch and we went down to the

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ground in the same banana-smelling cherry picker.

The plane had stopped outside the hangar. There were a couple of photographers at the base of the cherry picker taking each couple's picture as they stood on terra firma once again, grinning out from their space suit helmets. The first tourists in space.

Sam popped out of the cockpit and personally escorted me to the hatch and went down the cherry picker with me and my seat companion. He posed for the photographer between us, his arms on our shoulders, standing on tip-toe.

The thirty-nine other tourists went their separate ways that afternoon, clutching their photographs and smiling with their memories of space flight the way a new saint smiles at the revelation of heaven. They were converts, sure enough. They would go back home and tell everyone they knew about their space adventure. They were going to be Sam's best sales force.

I had a decision to make. I had started out investigating Sam for you, Uncle Griff, with the probability that his so-called tourist operation was a front for narcotics smuggling. But it sure didn't look that way to me.

Besides, I really liked the little guy. He was a combination of Huckleberry Finn and Long John Silver, with a bit of Chuck Yeager thrown in.

Yet I had come on to Sam as a wide-eyed tourist. If I hung around Colón, sooner or later he'd realize that I hadn't told him the exact truth about myself. I discovered, to my own surprise—shock, really—that I didn't want to hurt Sam's feelings. Worse, I didn't want him to know that I had been spying on him. I didn't want Sam Gunn to hate me.

So I had to leave. Unless Sam *asked* me to stay.

Like a fool, I decided to get him to ask me.

He invited me to dinner that evening. "A farewell dinner," he called it. I spent the afternoon shopping for the slinkiest, sexiest black lace drop-dead dress I could find. Then I had my hair done: I usually wore it pinned up or in a ponytail, part of my sweet-sixteen pose. Now I had it sweeping down to my bare shoulders, soft and alluring.

I hoped.

Sam's eyes bugged out a bit when he saw me. That was good.

"My god, Ramona, you're . . . " he fished around for a compliment, " . . . you're *beautiful!*"

"Thank you," I said, and swept past him to settle myself in his convertible, showing plenty of thigh in the process.

Don't growl, Uncle Griff. I was emotionally involved with Sam. I know I shouldn't have been, but at the time there wasn't much I could do about it.

Sam was bouncing with enthusiasm about his first flight, of course.

"It worked!" he shouted, exultant, as he screeched the convertible out of my hotel's driveway. "Everything worked like a mother-loving charm! Nothing went wrong. Not one thing! Not a transistor or a data bit out of place. Perfect! One thousand batting average. Murphy's Law sleeps with the fishes."

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He was so excited about the successful flight that he really wasn't paying much attention to me. And the breeze as we drove through the twilight was pulling my carefully-done coiffure apart.

Sam took me to a quiet little restaurant out in a suburban shopping mall, of all places. The food was wonderful, but our conversation—over candlelight and wine—continued to deal with business instead of romance.

"If we start the flights at seven in the morning instead of nine, we can get in an afternoon flight, too," Sam was musing, grinning like an elf on amphetamines. "Double our income."

"Will your customers be able to get up that early?" I heard myself asking, intrigued by his visions of success despite myself. "Some of them are pretty old and creaky."

Sam waved a hand in the air. "We'll schedule the oldest ones for afternoon flights. Take the spryer ones in the morning. Maybe give 'em a slight break in the price for getting up so early."

I wanted Sam to pay attention to me, but his head was filled with plans for the future of Space Adventure Tours. Feeling a little downhearted, I decided that if I couldn't beat him I might as well join him.

"It was a great flight," I assured him. Not that he needed it; I did. "I'd love to go again, if only I could afford it."

Either Sam didn't hear me or he paid me no attention.

"I was worried something would go wrong," he rattled on. "You know, something always gets away from you on a mission as tricky as this one. But it all worked fine. Better than fine. Terrific!"

It took a while before Sam drew enough of a breath for me to jump into his monologue. But at last I said:

"Sam, I've been thinking. Your anti-disequilibrium system—"

"What about it?" he snapped, suddenly looking wary.

"It worked so well . . . "

His expression eased. His elfin grin returned. "Sure it did."

"Why don't you license it to NASA or some of the corporations that are building space stations in orbit? It could be a steady source of income for you."

"No," he said. Flat and final.

"Why not? You could make good money from it—"

"And let Masterson or one of the other big corporations compete with Space Adventure Tours? They'd drive us out of business in two months."

"How could they do that?" I really was naive, I guess.

Sam explained patiently, "If I let them get their foot in the door they'll just price tours so far below cost that I'll either lose all my customers or go bankrupt trying to compete with 'em."

"Oh."

"Besides," he added, his eyes avoiding mine, "if they ever got their hands on my system they'd just duplicate it and stop paying me."

"But you've patented the system, haven't you?"

His eyes became really evasive. "Not yet. Patents take time."

Suddenly our celebration dinner had turned glum. The mood had been bro-

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ken, the charm lost, the enchantment gone. Maybe we were both tired from the excitement of the day and our adrenaline rush had petered out. Whatever the reason, we finished dinner and Sam drove me back to my hotel.

"I guess you're going back to the States," he said. once he stopped the convertible at the hotel's front entrance.

"I guess," I said.

"It's been fun knowing you, Ramona. You've been a good-luck charm for me."

I sighed. "Wish I didn't have to leave."

"Me too."

"Maybe I could find a job here," I hinted.

Sam didn't reply. He could have said he'd find a position for me in his company, but it's probably better that he didn't, the way things worked out.

The hotel doorman came grudgingly up to the car and opened my door with a murmured, *"Buenas noches."*

I went up to my room, feeling miserable. I couldn't sleep. I tossed in the bed, wide awake, unhappy, trying to sort out my feelings and take some control of them. Didn't do me one bit of good. After hours of lying there in the same bed Sam and I had made love in, I tried pacing the floor.

Finally, in desperation, I went back to bed and turned on the TV. Most of the channels were in Spanish, of course, but I flicked through to find some English-speaking movie or something else that would hypnotize me to sleep.

And ran across the weather channel.

I almost missed it, surfing through the channels the way I was. But I heard the commentator say something about a hurricane as I surfed through. It took a couple of seconds for the words to make an impression on my conscious mind.

Then I clicked back to the weather. Sure enough, there was a monster hurricane roaring through the Caribbean. It was too far north to threaten Panama, but it was heading toward Cuba and maybe eventually Florida.

When we orbited over the region, not much more than twelve hours ago, the Caribbean had been clear as crystal. I remember staring out at Cuba; I could even see the little tail of the keys extending out from Florida's southern tip. No hurricane in sight.

I punched up my pillows and sat up in bed, watching the weather. The American Midwest was cut in half by a cold front that spread early-season snow in Minnesota and rain southward all the way to Louisiana. The whole Mississippi valley was covered with clouds.

But the Mississippi was clearly visible for its entire length when we'd been up in orbit that morning.

Could the weather change that fast?

I fell asleep with the weather channel bleating at me. And dreamed weird, convoluted dreams about Sam and hurricanes and watching television.

The next morning I packed and left Colón, but only flew as far as Panamá City, on the Pacific side of the canal. I was determined to find out how Sam had tricked me. Deceived all forty of

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us. But I was taking no chances on bumping into Sam in Colón.

Within a week Sam was doing a roaring business in space tours. He hadn't gotten to the point where he was flying two trips per day, but a telephone call to his company revealed that Space Adventure Tours was completely booked for the next four months. The smiling young woman who took my call cheerfully informed me that she could take a reservation for early in February, if I liked.

I declined. Then I phoned my boss at the DEA in Washington, to get him to find me an Air Force pilot.

"Someone who's never been anywhere near NASA," I told my boss. I didn't want to run the risk of getting a pilot who might have been even a chance acquaintance of Sam's. "And make sure he's male," I added. Sam was just too heart-meltingly charming when he wanted to be. I would take no chances.

What they sent me was Hector Dominguez, a swarthy, broad-shouldered, almost totally silent young pilot fresh from the Air Force Academy. I met him in the lobby of my hotel, the once-elegant old Ritz. It was easy to spot him: he wasn't in uniform, but he might as well have been, with a starched white shirt, knife-edged creases on his dark blue slacks, and a military buzz cut. He'd *never* make it as an undercover agent.

I needed him for flying, thank goodness, not spying. I introduced myself and led him to the hotel's restaurant, where I explained what I wanted over lunch. He nodded in the right places and mumbled an occasional, "Yes, Ma'am." His longest conversational offering was, "Please pass the bread, Ma'am."

He made me feel like I was ninety! But he apparently knew his stuff, and the next morning when I drove out to the airport he was standing beside a swept-wing jet trainer, in his flier's sky-blue coveralls, waiting for me.

He helped me into a pair of coveralls, very gingerly. I got the impression that he was afraid I'd complain of sexual harassment if he actually touched me. Once I had to lean on his shoulder, when I was worming into the parachute harness I had to put on; I thought he'd break the Olympic record for long jump, the way he flinched away from me.

The ground crew helped me clamber up into the cockpit, connected my radio and oxygen lines, buckled my seat harness and showed me how to fasten the oxygen mask to my plastic helmet. Then they got out of the way and the clear bubble of the plane's canopy clamped down over Hector and me.

Once we were buttoned up in the plane's narrow cockpit, me up front and him behind me, he changed completely.

"We'll be following their 747," Hector's voice crackled in my helmet earphones, "up to its maximum altitude of fifty thousand feet."

"That's where the orbiter is supposed to separate from it," I said, needlessly.

"Right. We'll stay within visual contact of the 747 until the orbiter returns."

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If it ever actually leaves the 747, I thought.

Hector was a smooth pilot. He got the little jet trainer off the runway and arrowed us up across the Panama Canal. In less than fifteen minutes we spotted the lumbering 747 and piggybacking orbiter, with their bright blue SPACE ADVENTURE TOURS stenciled across their white fuselages.

For more than three hours we followed them. The orbiter never separated from the 747. The two flew serenely across the Caribbean, locked together like Siamese twins. Far below us, on the fringe of the northern horizon, I could see bands of swirling gray-white clouds: the edge of the hurricane.

Sam's 747-and-orbiter only went as high as thirty thousand feet, then leveled out.

"He's out of the main traffic routes," Hector informed me. "Nobody around for a hundred miles, except us."

"They can't see us, can they?"

"Not unless they have rear-looking radar."

Hector kept us behind and slightly below Sam's hybrid aircraft. Then I saw the 747's nose pull up; they started climbing. Hector stayed right on station behind them, as if we were connected by an invisible chain.

Sam's craft climbed more steeply, then nosed over into a shallow dive. We did the same, and I felt my stomach drop away for a heart-stopping few moments before a feeling of weight returned.

In my earphones I heard Hector chuckling. "That's how he gave you a feeling of zero-g," he said. "It's the old Vomit Comet trick. They use it at Houston to give astronauts-in-training a feeling for zero gravity."

"What do you mean?" I asked.

"You fly a parabolic arc: up at the top of the arc you get a few seconds of pretty-near zero gravity."

"That's when we felt weightless!" I realized.

"Yeah. And when they leveled off you thought his anti-space-sickness equipment was working. All he did was start flying straight and level again."

Magic tricks are simple when you learn how they're done.

"What did you say about a vomit something or other?"

Hector laughed again. It was a very pleasant, warm sound. "At Houston, they call the training plane the Vomit Comet. That's because they fly a couple dozen parabolic arcs each flight. You go from regular gravity to zero-g and back again every few minutes. Makes your stomach go crazy."

So Sam's entire space adventure was a total shuck. A sham. A hoax. I had felt disappointed when I'd first suspected Sam. Now that I had the evidence, I felt even worse: bitter, sad, miserable.

I know, Uncle Griff! You told me he was no good. But—well, I still felt awful.

That evening I just couldn't bear the thought of eating alone, so I invited Hector to have dinner with me. He was staying at the Ritz, too, so we went to the hotel's shabby old restaurant. It must have once been a splendid place, but it was tacky and run-

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down and not even half-filled. The waiters were all ancient, and even though the food was really good, the meal left me even more depressed than I had been before.

To make it all worse, Hector reverted to his monosyllabic introversion once we left the airport.

Is it me? I wondered. Is he naturally shy around women? Is he gay? That would've been a shame, I thought. He was really handsome, in a dark, smoldering sort of way. Gorgeous big midnight eyes. And I imagined that his hair would grow out curly if he ever allowed it to. His voice was low and dreamy, too—when he chose to say a word or two.

I tried to make conversation with him, but it was like pulling teeth. It took the whole dinner to find out that he was from New Mexico, he wasn't married, and he intended to make a career of the Air Force.

"I like to fly." That was his longest sentence of the evening.

I went to bed wanting to cry. I dreamed about Sam; I dreamed that I was a hired assassin and I had to kill him.

Hector and I trailed Sam's plane again the next day, but this time I brought a video camera and got his entire flight sequence on tape. Evidence.

A job is a job, and no matter how much I hated doing it, I was here to get the goods on Sam Gunn. So he wasn't smuggling drugs. What he was doing was still wrong: bilking people of their hard-earned money on phony promises to fly them into space. Scamming little old widows and retired couples living on pensions. Swindling honeymoon couples.

And let's face it, he swindled me, too. In more ways than one.

That afternoon I had Hector fly me over to Colón and, together, we went to the offices of Space Adventure Tours.

Sam seemed truly delighted to see us. He ushered us into his elegant office with a huge grin on his apple-pie face. Then he shook hands with Hector, bussed me on the cheek, and climbed the ramp behind his walnut and chrome desk to sit down in his high-backed leather swivel chair. Hector and I sat on the two recliners.

"Are you two a thing?" Sam asked, archly.

"A thing?" I asked back.

"Romantically."

"No!" I was surprised to hear Hector blurt the word out just as forcefully as I did. Stereophonic denial.

"Oh." Sam looked slightly disappointed, but only for a moment. "I thought maybe you wanted to take a honeymoon flight in space."

"Sam, you never go higher than thirty-five thousand feet and I have a videotape to prove it."

He blinked at me. It was the first time I'd ever seen Sam Gunn go silent.

"Your whole scheme is a fake, Sam. A fraud. You're stealing your customers' money. That's theft. Grand larceny, I'm sure."

The sadness I had felt was giving way to anger: smoldering burning rage at this man who had seemed so wonderful but was really such a scoundrel, such a rat, such a lying, sneaking, thiev-

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ing bastard. I had trusted Sam! And he had been nothing but deceit.

Sam leaned back in his luxurious desk chair and puckered his lips thoughtfully.

"You're going to jail, Sam. For a long time."

"May I point out, oh righteous, wrathful one, that you're assuming the laws of Panama are the same as the laws of the good old U.S. of A."

"They have laws against fraud and bunko," I shot back hotly, "even in Panama."

"Do you think I've defrauded my customers, Ramona?"

"You certainly have!"

Very calmly, Sam asked, "Did you enjoy your flight?"

"What's that got to do with it?"

"Did you enjoy it?" Sam insisted.

"At the time, yes, I did. But then I found out—"

"You found out that you didn't actually go into orbit. You found out that we just fly our customers around and make them *feel* as if they're in space."

"Your whole operation is a fake!"

He made an equivocal gesture with his hands. "We don't take you into orbit, that's true. The scenes you see through the spacecraft's windows are videos from real space flights, though. You're seeing what you'd see if you actually did go into space."

"You're telling your customers that you take them into space!" I nearly screamed. "That's a lie!"

Sam opened a desk drawer and pulled out a slick, multi-color sales brochure. He slid it across the desk toward me.

"Show me where it says we take our customers into orbit."

I glanced at the brochure's cover. It showed a picture of an elderly couple smiling so wide their dentures were in danger of falling out. Behind them was a backdrop of the Earth as seen from orbit.

"Nowhere in our promotional literature or video presentations do we promise to take out customers into space," Sam said evenly.

"But—"

"The contracts our customers sign say that Space Adventure Tours will give them an *experience* of space flight. Which is what we do. We give our customers a simulation: a carefully designed simulation so that they can have the *experience* of their lives."

"You tell them you're taking them into space!"

"Do not."

"You do too! You told *me* you'd fly me into orbit!"

Sam shook his head sadly. "That may be what you heard. What you wanted to hear. But I have never told any of my customers that Space Adventure Tours would actually, physically, transport them into orbit."

"You did! You did!"

"No I didn't. If you'd taped our conversations, you'd find that I never told you—or anybody else—that I'd fly you into space."

I looked at Hector. He sat like a graven idol: silent and unmoving.

"When we were in the orbiter," I remembered, "you made all this talk about separating from the 747 and going into orbit."

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"That was part of the simulation," Sam said. "Once you're on board the orbiter, it's all an act. It's all part of the experience. Like an amusement park ride."

Exasperated, I said, "Sam, your customers are going home and telling their friends and relatives that they've really flown in space. They're sending new customers to you, people who expect to go into orbit for real!"

With a shrug, Sam answered, "Ramona, honey, I'm not responsible for what people think, or say, or do. If they wanna believe they've really been in space, that's their fantasy, their happiness. Who am I to deny them?"

I was beyond fury. My insides felt bitter cold. "All right," I said icily. "Suppose I go back to the States and let the news media know what you're doing? How long do you think customers will keep coming?"

Sam's brows knit slightly. "Gimme two more months," he said.

"Two more months?"

"Let me operate like this for two more months, and then I'll close down voluntarily."

"You're asking me to allow you to defraud the public for another two months?"

His eyes narrowed. "You know, you're talking like a lawyer. Or maybe a cop."

"What and who I am has nothing to do with this," I snapped.

"A cop," Sam said, with a heavy sigh.

Out of nowhere, Hector spoke up. "Why do you want two months?"

I whirled on the poor guy. "So he can steal as much money as he can from the poor unsuspecting slobs he calls his customers, why else?"

"Yeah," Hector said, in that smoky low voice of his, "OK, maybe so. But why two months?"

Before I could think of an answer, Sam popped in. "Because in two months I'll have proved my point."

"What point?"

"That there's a viable market for tourists in space. That people'll spend a good-sized hunk of change just for the chance to ride into orbit."

"Which you don't really do," I reminded him.

"That doesn't matter," Sam said. "The point I'm making is that there really is a market for space tourism. People have been talking about space tourism for years; I'm doing something about it."

"You're stealing," I said. "Swindling."

"OK, so I'm faking it. Nevertheless, people are plunking down their money for a space adventure."

"So what?" I sneered.

Hunching forward, leaning his forearms on the gleaming desktop, Sam said, "So with three whole months of this operation behind me, I can go back to the States and raise enough capital to lease a Clippership that'll *really* take tourists into orbit."

I stared at him.

Hector got the point before I did. "You mean the financial people won't believe there's a market for space tourism now, but they will after you've operated this fake business for three months?"

"Right," Sam answered. "Those Wall Street types don't open up their

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wallets until you've got solid numbers to show 'em."

"What about venture capitalists?" Hector asked. "They back new, untried ideas all the time."

Sam made a sour face. "Sure they do. I went to some of 'em. First thing they did was ask me why the big boys like Masterson and Global Technologies aren't doing it. Then they go to the 'experts' in the field and ask their opinion of the idea. And who're the experts?"

"Masterson and Global," I guessed.

Shaking his head, Sam said, "Even worse. They went to NASA. To Clark Griffith IV, my own boss, for crap's sake! By the time he got done scaring the *cojones* off them, they wouldn't even answer my e-mail."

"NASA shot you down?"

"They didn't know it was me. They talked to a team that the venture capitalists put together."

I asked, "But shouldn't NASA be in favor of space tourism? I mean, they're the space agency, after all."

"Some people in NASA are in favor of it, sure," Sam said. "But the higher you go in the agency the more conservative they get. Up at the top they have nightmares of a spacecraft full of tourists blowing up, like the old *Challenger*. That'd set back everything we do in space by ten years, at least."

"So when the venture capitalists asked—"

"The agency bigwigs threw enough cold water on the idea to freeze the Amazon River," Sam growled.

"And that's when you started Space Adventure Tours," I said.

"Right. Set the whole company up while I was still working at the Cape. Then I took a three-month leave to personally run the operation. I've got two months left to go."

Silence. I sat there, not knowing what to say next. Hector looked thoughtful, or maybe puzzled is a better description of the expression on his face. Sam leaned back in his high chair, staring at me like a little boy who's been caught with his hand in the cookie jar, but is hoping to get a cookie out of it instead of a spanking.

I was in a turmoil of conflicting emotions. I really liked Sam, even though he had quite literally screwed me. But I couldn't let him continue to swindle people; that was wrong any way you looked at it, legally or morally.

On the other hand, Sam wasn't really hurting anybody. Was he? Did any of his customers empty their retirement accounts to take his phony ride? Would any of those retired couples spend their declining years in poverty because Sam bilked them out of their life savings?

I shook my head, trying to settle my spinning thoughts into some rational order. Sam was breaking all kinds of laws, and he'd have to stop. Right now.

"All right," I said, my mind finally made up. "I'm not going to report this back to your superiors at NASA."

Sam's face lit up.

"And I'm not going to blow the whistle on you or bring in the authorities," I continued.

Sam grinned from ear to ear.

"On one condition," I said firmly.

His rusty eyebrows hiked up. "One condition?"

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"You've got to shut this operation down, Sam. Either shut down voluntarily, or I'll be forced to inform the authorities here in Panama and the news media in the States."

He nodded solemnly. "Fair enough. In two months I'll close up shop."

"Not in two months," I snapped. "Now. Today. You go out of business *now* and refund whatever monies you've collected for future flights."

I expected Sam to argue. I expected him to rant and holler at me. Or at least plead and wheedle. He did neither. For long, long moments he simply sat there staring at me, saying nothing, his face looking as if I'd just put a bullet through his heart.

I steeled myself and stared right back at him. Hector stirred uneasily in his chair beside me, sensing that there was more going on than we had expressed in words, but saying nothing.

At last Sam heaved an enormous sigh and said, in a tiny little exhausted voice, "OK, if that's what you want. I'm in no position to fight back."

I should have known right there and then that he was lying through his crooked teeth.

Hector flew me back to Panamá City and we repaired to our separate hotel rooms. I felt totally drained, really out of it, as if I'd spent the day fighting dragons or climbing cliffs by my fingernails.

Then things started to get weird.

I had just flopped on my hotel room bed, not even bothering to take off my clothes, when the phone rang. My boss from DEA headquarters in Washington.

"You're going to have a visitor," he told me, looking nettled in the tiny phone screen. "Her name will be Jones. Listen to what she has to tell you and act accordingly."

"A visitor?" I mumbled, feeling thick-headed, confused. "Who? Why?"

My boss doesn't nettle easily, but he sure looked ticked off. "She'll explain it all to you. And this is the last goddamned time I let you or any other of my people go off on detached duty to help some other agency!"

With that, he cut off the connection. I was looking at a blank phone screen, wondering what on earth was going on.

The phone buzzed again. This time it was Hector.

"I just got a phone call from my group commander at Eglin," he said. "Some really weird shit has hit the fan, Ramona. I'm under orders to stay here in Panama with you until we meet with some woman named Jones."

"I got the same orders from my boss," I told him.

Hector's darkly handsome face went into brooding mode. "I don't like the sound of this," he muttered.

"Neither do I," I confessed.

We didn't have long to wait. Ms. Jones arrived bright and early the following morning. In fact, Hector and I were having breakfast together in the hotel's nearly-empty dining room, trying to guess what was going on, when she sauntered in.

She didn't hesitate a moment, just walked right up to our table and sat down, as if she'd been studying photographs of us for the past week or two.

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"Adrienne Jones," she said, opening her black leather shoulder bag and pulling out a leather-encased laminated ID card. It said she was with the U.S. Department of State.

She didn't look like a diplomat. Adrienne Jones—if that was really her name—was a tall, sleek, leggy African-American whose skin was the color of polished ebony. She had a fashion-model's figure and face: high cheekbones, almond eyes, and a tousled, careless hairdo that must have cost a fortune. Her clothes were expensive, too.

Hector stared at her, too stunned to speak. I felt dismal and threadbare beside her in my shapeless slacks and blouse, with a belly bag strapped around my middle.

I hated her immediately.

"If you're really with the State Department," I said as she snapped her ID closed and put it back in her capacious shoulder bag, "then I'm from Disney World."

She smiled at me the way a snake does. "That's the one in Florida, isn't it?"

Hector found his voice. "CIA, right? You've got to be with the CIA."

Jones ignored his guess. "You both have been informed that you are to cooperate with me, correct?"

"I was told to listen to what you have to say," I said.

"Me too," said Hector.

"Very well, then. Here's what I have to say: Leave Sam Gunn alone. Let him continue to operate. Do not interfere with him in any way."

What kind of strings had Sam pulled? He had come across to me as the little guy struggling against the big boys, but here was the State Department or the CIA—or *some* federal agency—ordering me to keep my hands off.

"Why?" I asked.

"You don't have to know," said Jones. "Just leave Sam be. No interference with his operation."

Hector scratched his head and glanced at me. He was an Air Force officer, I realized, and had to follow orders. His career depended on it. Me, I had a career, too. But I wasn't going to let this fashion-model stranger order me around, no matter what my boss said.

"OK," I told her, "I've listened to what you have to say. That doesn't mean I'm going to do what you're asking me to do."

Jones smiled again, venomously. "I'm not asking you. I'm telling you."

"You can tell me whatever you like. I'm not going to go along with it unless I know the whys and wherefors."

Her smile faded into grimness. "Look, Ms. Perkins, your superior at DEA has been briefed and he agreed to cooperate. He's told you to cooperate, and that's what you'd better do, if you know what's good for you."

"You briefed him? Then brief me."

She snorted through her finely-chiseled nostrils. "All I can tell you is that this is a high-priority matter, and it has the backing of the highest levels of authority."

"Highest levels?" I asked. "Like the White House?"

She didn't answer.

"The Oval Office? The President himself?"

Jones remained as silent and still as the Sphinx.

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I heard myself say, "Not good enough, Ms. Jones. Anybody can claim they're working on orders from the White House. I've heard even fancier stories, in my line of work. What's going on?"

She merely shook her head, just the slightest of motions, but clearly a negative.

"OK then." I got up from my chair. "I'm catching the next flight to Miami and going straight to the news media. They'll be really interested to hear that the CIA is backing a fraudulent tourist operation in Panama."

"I wouldn't try that if I were you," Jones said.

Hector stood up beside me. "You threaten her, you've got to go through me."

I gaped at him. "You don't have to protect me. I can take care of myself."

"I'm in this, too," he insisted. "We're partners."

Jones threw her head back and laughed. "What you two are," she said, "is a couple of babes in the woods. And if you don't start behaving yourselves, you're going to end up as babes in a swamp, feeding alligators."

I unzipped my belly bag and pulled out my cellphone. "CNN, Atlanta, USA," I said to the phone system's computer. "News desk."

"Put it down," Jones said.

I kept the phone pressed against my ear, listening to the computer chatter as the system made the connection.

"Put it down," she repeated. Her voice was flat, calm, yet menacing. I realized that her black leather shoulder bag was big enough to hold a small arsenal.

"News," I heard a tired voice answer.

Jones said, "We can cut a deal, if you're reasonable."

"News desk," the voice repeated, a little irked.

I put the phone down and clicked it off. "What kind of a deal?"

Jones gestured with both her hands; she had long, graceful fingers, I noticed. I sat down, then Hector took his seat beside me.

"God spare me the righteous amateurs," Jones muttered. "You two have no idea of what you're messing with."

"Then tell us," I said.

"I can't tell you," she replied. "But if you want to, you can come back to Colón with me and watch it happen."

I didn't know what to say.

Jones misinterpreted my silence as reluctance, so she went on, "You give me your word you won't go blowing off to the media or anybody else, and you can come with me and see what this is all about. After it's over you can go back home, safe and sound. Deal?"

I'd seen enough drug deals to know that she was showing us only the tip of the iceberg. But I was curious, and—to tell the absolute truth—I was wondering how Sam got himself mixed up with the CIA and whether he was in danger or not.

So I glanced at Hector, who remained silent, suspicious. But he looked at me and his expression said that he'd back whatever move I made. So I said, "Deal."

We couldn't squeeze a third body into Hector's training jet, and Jones

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didn't trust us out of her sight, so we flew back to Colón again in her plane: a twin-engined executive jet. I was beginning to feel like a Ping-Pong ball, bouncing from Colón to Panamá City and back again.

Hector was impressed with the plane's luxurious interior. "Like a movie," he said, awed. Instead of sitting beside me, he asked to go up into the cockpit. Jones gave him a friendly smile and said OK. I didn't see him again until we landed.

An unmarked Mercedes four-door sedan was waiting for us at the runway ramp, the kind of luxury car the drug dealers call a "cocaine Ford." Two men in dark suits bustled Hector and me into the rear seat. Jones sat up front with the driver. The other man followed us in another unmarked Mercedes. I felt distinctly nervous.

But all we did is drive across the airport to Sam's converted blimp hangar.

"Mr. Gunn is doing a special flight this afternoon," Jones told us cryptically, half turned in her seat to face us. "Once it's finished, you two can go back to the States—*if* you promise not to blow the whistle on Space Adventure Tours."

"And if we don't promise?" I asked. Instead of strong and forceful, my voice came out as a little girl's squeak, which made me disgusted with myself.

Jones didn't answer; she merely reverted to her rattler-type smile.

We pulled up outside the hangar. Inside, I could see the big 747 with the orbiter clamped atop it. Technicians were swarming all over it.

"Sam had his regular flight this morning," I muttered to Hector. "Now they're getting the plane ready for another flight."

Hector nodded. "Looks like."

We sat and watched, while our Mercedes' engine purred away so the car's air conditioning could stay on. Sam came out of an office up on the catwalk above the hangar floor, with two slick looking lawyerly types flanking him. He was grinning and gabbing away a mile a minute, happy as a kid in a candy store. Or so it seemed from this distance.

Jones opened her door. "You stay here," she said—as much to the driver as to us, I thought. "Don't leave this car."

So we sat in the car with the afternoon sun beating down on us and the air conditioner laboring to keep the interior cool. Our driver was old enough to be gray at the temples, solidly built, and I guessed that he was carrying a nine-millimeter automatic in a shoulder holster under his dark suit jacket. He looked perfectly comfortable and prepared to sit and watch over us for hours and hours.

I was bursting to find out what was going on. There were more technicians clambering over the ladders and scaffolds surrounding the piggy-back planes than I had ever seen in Sam's employ. Most of them must be Jones' people, I thought. Something very special is being cooked up here.

Jones stood out in the blazing sunshine, trying to look cool and relaxed behind a pair of elegantly stylish sunglasses. Yet I sensed she was wired tight with anticipation.

Then a fleet of limousines drove

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into view, coming slowly across the concrete rampway until they stopped in front of the hangar. Eleven limos, I counted. One of them had stiff little flags attached to its front fenders: blue with some kind of shield or seal in the middle, surrounded by six five-pointed white stars.

Dozens of men jumped out of the limos, about half of them in olive-green army fatigues. They didn't look like Americans. Each soldier carried a wicked-looking assault rifle with a curved magazine. The rest of the men wore business suits that bulged beneath their armpits and the kind of dark sunglasses that just screamed "bodyguard."

They spread out, poking their noses—and rifle muzzles—into every corner of the hangar. A couple of the suits came up to our car, where the glamorous Ms. Jones greeted them with a big toothy smile. I couldn't make out what she was saying to them, but it sounded like she was speaking in Spanish.

Sam came bubbling over, practically drooling once he feasted his eyes on Jones. He didn't notice us inside the car, behind the heavily-tinted windows.

At last, the leader of the suits turned to the team of soldiers surrounding the limo and gave a curt nod. They opened the rear door and out stepped a little girl, with big dark eyes and long hair that just had to be naturally curly. She couldn't have been more than ten years old. She smiled at the soldiers, as if she knew them by name. She was very nicely dressed in a one-piece jumpsuit of butter yellow.

She turned back and said something to someone who was still inside the limo. She reached her hand in to whoever it was. A tall, lean man of about fifty came out of the limo and stretched to his full height. He was wearing army fatigues and smoking an immense cigar.

My jaw fell open. "That's the president of Cuba!" I gasped. "The man who took over when Castro retired."

"No," Hector corrected me. "He's the man who took over after the bloodbath in Havana when Castro retired."

"That must be his daughter."

"What're they doing here?" Hector wondered.

"Taking one of Sam's phony rides into space," I said. "I wonder if they know it's a phony."

Hector turned to face me. "Maybe it's not."

"Not what?"

"Not a phony," he said grimly. "Maybe they're going to have an accident up there. On purpose."

It hit me like a shot of pure heroin. "They're going to assassinate the president of Cuba!"

"And make it look like an accident."

"Oh my god!"

The driver turned slightly to tell us, "Don't get any crazy ideas—"

He never got any further. I jammed my thumbs into his carotids and held on. In a few seconds he was unconscious.

"Where'd you learn that?" Hector asked, his tone somewhere between amazement and admiration.

"South Philadelphia," I answered as I yanked the nine-millimeter from the driver's holster. "Come on."

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Hector grasped my shoulder. "You're not going to get far in a shoot-out."

He was right, dammit. I had to think fast. Outside, I could see Jones leading the president of Cuba and his daughter toward the plane. Half the Cuban security force walked a respectful distance behind them; the other half was deployed on either side of them.

"Most of those ground crew personnel must be security guys from the States," Hector pointed out. "Must be enough firepower out there to start World War III."

My eye lit on Sam. He was still standing in the sunshine of the ramp, outside the hangar, hardly more than ten meters from our car.

"Come on," I said, leaning past the unconscious driver to pop the door lock.

I stuffed the pistol in my belly bag; kept the bag unzippered so I could grab the gun quickly if I needed to.

Sam turned as we approached him. He looked surprised, then delighted.

"Ramona!" he said with a big grin. "I thought you two had gone back to the States."

"Not yet," I said grimly. "We're taking this flight with you."

For an instant Sam looked puzzled, but then he said, "Great. Come on, you can ride in the 747 with me."

"You're not going aboard the orbiter?"

"Not this flight," Sam said easily.

Of course not, I thought. On this flight the orbiter's really going to be released from the 747. Instead of going into space, as Sam promised, it was going to crash into the Caribbean. With the president of Cuba aboard, and his ten-year-old daughter.

"Sam, how could you do this?" I asked as we walked into the hangar.

"Listen, I was just as surprised as you would be when the State Department asked me to do it."

"With his little daughter, too."

We reached the ladder. "It was his daughter's idea," Sam said. "She wanted to take the space ride. Poppa's only doing this to please his little girl—and for the international publicity, of course."

With Sam leading the way we climbed up the ladder into the 747. Its interior was strictly utilitarian; no fancy decor. Most of the cavernous passenger cabin was empty. There were only seats up in the first-class section, below the cockpit. Sam, Hector, and I went up the spiral stairs and entered the cockpit, where a young woman in a pilot's uniform was already sitting in the right-hand seat.

"Can you fly this plane?" I asked Hector.

He stared at the control panels; the gauges and buttons and keypads seemed to stretch for miles. Looking out the windshield, I saw we were already so high up we might as well have been on oxygen.

"I've got a multi-engine license," Hector muttered.

"But can you fly *this* plane?" I insisted.

He nodded tightly. "I can fly anything."

Sam put on a quizzical look. "Why should he have to fly? I'm going to pilot this mission myself and I've got a qualified co-pilot here."

I pulled the pistol from my belly

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bag and pointed it at the co-pilot. "Get out," I said. "Hector, you take her place."

She stared at me, wide-eyed, frozen.

"*Vamos,*" Sam said, in the most un-Spanish accent I'd ever heard. The woman slipped out of the co-pilot's chair.

"What's this all about?" Sam asked, more intrigued than scared. "Why the toy cannon?"

I pointed the gun at him. "Sam, you're going to fly this plane just the way you would for any of your tourist flights. No more and no less."

He gave me one of his lopsided grins. "Sure. What else?"

There were two jumpseats behind the pilots' chairs. I took one and Sam's erstwhile co-pilot the other. I kept the pistol in my hand as we rolled out of the hangar, lit up the engines, and taxied to the runway.

"What do you think is going on here," Sam asked, "that makes you need a gun?"

"You know perfectly well what's going on," I said.

"Yeah," he answered ruefully. "But I don't know what *you* know."

"Who's in the orbiter's cockpit?" I asked.

"Some guy the State Department insisted on. They wanted their own people up there with *el presidente* and his daughter."

"Do they have parachutes?"

"Parachutes? What for?"

"They're all going down with the president and his daughter?"

"Whither he goest," Sam replied.

We took off smoothly and headed out over the Caribbean. Is this part of the Bermuda Triangle? I asked myself. Will this fatal accident be chalked up as another mystical happening, or the work of aliens from outer space?

"How could you let them use you like this, Sam?" I blurted.

He glanced over his shoulder at me, saw how miserable I felt, and quickly turned back to the plane's controls.

"Ramona, honey, when people that high up in the federal government want to make you jump, you really don't have all that much of a choice."

"You could have said no."

"And miss the chance of a lifetime! No way!"

So despite all his blather about hating bureaucracies and wanting to help ordinary people—the little guy, against the big shots of government and industry—Sam sold out when they put the pressure on him. He probably didn't have much of a choice, at that. Do what they tell you or you're out of business. Maybe they threatened his life. I'd heard stories about the CIA and how they worked both sides of the street. They'd even been involved in the drug traffic, according to rumors around headquarters.

We flew in dismal silence across a sparkling clear sea. At least, I grew silent. Sam spent the time acquainting Hector with the plane's controls and particular handling characteristics.

"Gotta remember we've got a ninety-nine ton brick on our backs," he chattered cheerfully, as if he didn't have a care in the world.

Hector nodded and listened, listened and nodded. Sam jabbered away, one pilot to another, oblivious to everything else except flying.

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Me, I was starting to worry about what was going to happen when we returned to Colón with the orbiter still intact and the Cuban president very much alive. Jones and her people would probably put the best face they could on it, like that's what they had intended all along: a good-will flight to help cement friendly relations between Cuba and the U.S. But I knew that if the CIA didn't get me, some fanatical old anti-Castro nutcake in Miami would come after me.

And Hector, too, I realized. I'd put his life in danger, when all he wanted was to protect me.

I felt really miserable about that. The poor guy was in as much danger as I was, even though none of this was his fault.

I studied his face as he sat in the copilot's chair next to Sam. Hector didn't look worried. Or frightened. Or even tense. He was happy as a clam, behind the controls of this monstrous plane, five miles over the deep blue sea.

"Now comes the tricky part," Sam was telling him, leaning over toward Hector slightly so he could hear him better.

Sitting on the jumpseat behind Sam, I tightened my grip on the pistol. "You're not going to separate the orbiter," I said firmly.

Without even glancing back at me, Sam broke into a cackling laughter. "Couldn't even if I wanted to, oh masked rider of the plains. The bird's welded on. You'd need a load of primacord to blast 'er loose."

"What about the explosive bolts?" I asked.

Sam cackled again. "That's part of the simulation, kiddo. There aren't any."

I saw that Hector was grinning, as if he knew something that I didn't.

"Then how do you intend to separate the orbiter?" I demanded.

"I don't," Sam replied.

"Then how . . . " The question died in my throat. I had been a fool. A stupendous fool. This wasn't an assassination plot; Sam was taking the president of Cuba—and his ten-year-old daughter—for a space flight experience, just as he'd taken several hundred other tourists.

I could feel my face burning. Hector, his smile gentle and sweet, turned toward me and said softly, "Maybe you should unload the gun, huh? Just to be on the safe side."

I clicked on the safety, then popped the magazine out of the pistol's grip.

I sat in silence for the rest of the flight. There was nothing for me to say. I had been an idiot, jumping to conclusions and suspecting Sam of being a partner in a heinous crime. I felt *awful*.

After the regular routine over the Caribbean, Sam turned us back to Colón, and we landed at the airport without incident. Sam taxied the plane to his hangar, where a throng of news reporters and photographers were waiting.

With his daughter clinging to his side, the president of Cuba gave a long and smiling speech in Spanish to the news people. Sam squirmed out of his pilot's chair and rushed down to the hangar floor so he could stand beside the Cuban president and bask

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in the glow of publicity. Naturally, he grabbed the woman who was supposed to be his co-pilot and took her along with him.

I stayed in the cockpit with Hector, watching the whole thing. I could see Ms. Jones hovering around the edge of the crowd, together with her people; even she was smiling.

El presidente put his arm around Sam's shoulders and spoke glowingly. It was still in Spanish, but the tone was very warm, very friendly. Cuban-American relations soared almost as high as the president thought he'd flown. Sam signed his autograph for the president's daughter. She was almost as tall as he, I noticed.

Cameras clicked and whirred, vidcams buzzed away, reporters shouted questions in English and Spanish. It was a field day—for everybody but me.

Hector shook his head and gave me a rueful grin. "I guess we were a little wrong about all this," he said, almost in a whisper.

"It's my fault," I said. "I got you into this."

"Don't look so sad. Everything came out OK. Sam's a hero."

All I wanted to do was to stay in that cockpit and hide forever.

At last *el presidente* and his daughter made their way back to their limousine. The fleet of limos departed and the crowd of media people broke up. Even the American State Department people started to leave. That's what they were, I reluctantly admitted to myself. Jones and her people really were from the State Department, not the CIA.

Finally Sam came strolling the length of the 747's cabin and climbed up the spiral staircase to the cockpit, whistling horribly off-key every step of the way.

He popped his head through the hatch, grinning like a Jack-o-lantern. "You want me to send some pizzas up here or are you gonna come out and have dinner with me?"

Hector took me by the hand, gently, and got to his feet. He had to bend over slightly in the low-ceilinged cockpit, a problem that Sam didn't have to worry about.

"We're coming out," he said. I let him lead me, like a docile little lamb.

We went straight to Sam's favorite restaurant, the waterfront shack that served such good fish. Jones was already there, sipping at a deadly-looking rum concoction and smiling happily.

"I ought to be angry with you two," she said, once we sat at the little round table with her.

"It's my fault," I said immediately. "I'm the one to blame."

Hector started to say something, but Jones shushed him with a gesture of her long, graceful hand. "No harm, no foul. The flight went *beautifully*, and I'm not going to screw up my report by even mentioning your names."

Sam was aglow. He ordered drinks for all of us, and as the waiter left our table, he looked over at the bar.

"Lookit that!" Sam said, pointing to the TV over the joint's fake-bamboo bar.

We saw the president of Cuba smiling toothily, his daughter on one side of him and Sam Gunn on the other.

"World-wide publicity!" Sam crowed. "I'm a made man!"

Hector shook his head. "If anybody

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ever finds out that your orbiter never left the 747, Sam, the publicity won't be so good."

For Hector, that was a marathon speech.

Sam grinned at him. "Now who's going to tell on me? The Department of State?"

Jones shook her head. "Not us."

"NASA?" Sam asked rhetorically. "You think some rocket expert in NASA's gonna stand up and declare that you can't re-mate the orbiter with its carrier plane once it's been separated?"

Before any of us could reply, Sam answered his own question. "In a pig's eye! The word's going through the agency now, from top to bottom: no comment on Space Adventure Tours. Zip. Nada. Zilch. The lid is on and it's on tight."

"What about you two?" Jones asked, arching a perfect brow.

Hector glanced at me, then shrugged. "I'm in the Air Force. If I'm ordered to keep quiet, I'll keep quiet."

"And you, Ms. Perkins?" Jones asked me.

I focused on Sam. "You promised to end this bogus business in two months, Sam."

"Yeah, that's right, I did."

"Did you tell the president of Cuba that all he got was a simulation?" I asked.

Sam screwed up his face and admitted, "Not exactly."

"What happens to Cuban-American relations when he finds out?"

Jones's smile had evaporated. "Which brings us back to the vital question: are you going to try to blow the whistle?"

I didn't like the sound of that *try to*.

"No, she's not," Sam said. "Ramona's a good American citizen and this is a matter of international relations now."

The gall of the man! He had elevated his scam into an integral part of the State Department's efforts to end the generations-old split between Cuba and the U.S. I wondered who in Washington had been crazy enough to hang our foreign policy on Sam Gunn's trickery and deceit. Probably the same kind of desk-bound lunkheads who had once dickered with the Mafia to assassinate Castro with a poisoned cigar.

"I want to hear what you have to say, Ms. Perkins," Jones said, her voice low but hard as steel.

What could I say? What did I *want* to say? I really didn't know.

But I heard my own voice tell them, "Sam promised to close down Space Adventure Tours in two more months. I think that would be a good idea."

Sam nodded slowly. "Sure. By that time I oughtta be able to raise enough capital to buy a Clippership and take tourists into orbit for real."

Jones looked from me to Sam and back again.

Sam added, "Of course, it would help if the State Department ponied up some funding for me."

She snapped her attention to Sam. "Now wait a minute . . . "

"Not a lot," Sam said. "Ten or twenty million, that's all."

Jones's mouth dropped open. Then she yelped, "That's extortion!"

Sam placed both hands on his flow-

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ered shirt in a gesture of aggrieved innocence. "Extortion? Me?"

"And that's just about the whole story, Uncle Griff," Ramona said to me.

I leaned back in my desk chair and stared at her. "That business with the president of Cuba happened two months ago. What kept you down there in Panama until now?"

She blushed. Even beneath her deep suntan I could see her cheeks reddening.

"Uh . . . well, I wanted to stay on Sam's tail and make certain he closed up his operation when he promised he would."

Sam hadn't closed Space Adventure Tours, I knew. He had suspended operations in Panama and returned to the agency. Gone back on duty. He was scheduled for a classified Air Force mission, of all things. I had talked myself blue in the face, trying to get the astronaut office in Houston to replace him with somebody else, but they kept insisting Sam was the best man they had for the mission. Lord knows who he bribed, and with what.

"You didn't have to stay in Panama all that time," I pointed out to my niece. "You could have kept tabs on him from here in Washington."

She blushed even more deeply. "Well, Uncle Griff, to tell the truth . . . it was sort of like a, you know, kind of like a honeymoon."

I snorted. Couldn't help it. The thought of my own little niece shacked up with . . .

"You were *living* with him?" I bellowed.

She just smiled at me. "Yes," she said, dreamily.

I was furious. "You let Sam Gunn—"

"Not Sam!" Ramona said quickly. Then she grinned at me. "You thought I was living with Sam?" She laughed at me.

Before I could ask, she told me, "Hector! We fell in love, Uncle Griff! We're going to get married."

That was different. Sort of. "Oh. Congratulations, I suppose. When?"

"Next year," my niece answered. "When Sam starts *real* flights into orbit, Hector and I are going to spend our official honeymoon in space!"

I wanted to puke.

So that's why we had to fire Sam Gunn. Government regulations specifically state that you can't be running a business of your own while you're on the federal payroll. Besides, the little S.O.B. made a shambles of everything he touched.

It wasn't easy, though. Actually firing somebody from a government job is never easy, and Sam played every delaying trick in the book. Just to see if he could give me apoplexy, I'm sure.

The little conniving sneak was even working out an arrangement to rent a section of a new space station and turn it into an orbiting honeymoon hotel before I finally got all the paperwork I needed to fire his butt out of the agency.

And he didn't leave quietly. Not Sam. Know what his final masterstroke was? He left me a prepaid ticket to ride his goddamned Clippership into orbit and spend a full week in his orbiting hotel.

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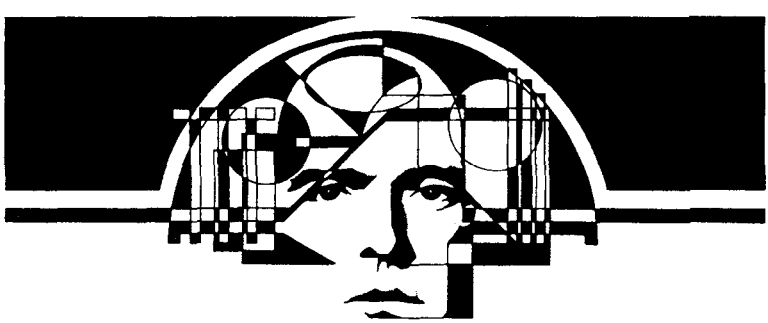
He knew damned well I'd never give him the satisfaction! Probably the little bastard thinks I'm too old to enjoy sex. Or maybe he expects me to bust a blood vessel while I'm making love in weightlessness.

But I'll fool him. Good and proper. I'm growing a beard. I'm getting hair implants. He'll never recognize me.

Who knows? If it's really as good in zero-*g* as Sam claims it is, maybe I'll even retire up there in orbit. Then I can drive Sam nuts, for a change.

That's something worth living for! ■

(Editor's Note: Sam Gunn appeared here earlier in "Sam's War," July 1994 and "Nursery Sam," January 1996.)



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Duncan Lunan

EPSILON BOÖTIS REVISITED

A new chapter in an old saga of astronomical archeology— or is that archeological astronomy?

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In January 1974 *Analog* published my article "Space Probe from Epsilon Boötis?,"[1] which caused such a stir that I'm still asked about it every time I appear in the magazine. It was based on the mystery of long-delayed radio "echoes" (LDEs), first reported in the 1920s.

Actually, the "echoes" were much too powerful to be simple reflections of signals from Earth. Experimenters studying round-the-world propagation of radio waves found their outgoing pulses were being returned to them with a delay of three seconds, as if they were being amplified and returned by something at the distance of the Moon—but definitely not the Moon itself. In later experiments the delay times began to vary upwards from three seconds, in increasingly complicated sequences, but with no variation in intensity—still indicating a single source amplifying and returning the pulses.

Prof. Ron Bracewell of Stanford suggested in 1960 that the "echoes" might have been rebroadcast by an unmanned probe from another civilization, trying to attract our attention, and in 1972 I worked out a "translation" of the 1920s' echo patterns. The variations of delay times appeared random; but Prof. Bracewell himself had suggested the first signal from such a probe might be a star map, and the stars are spaced at random in the sky. I tried plotting the delay times against the order in which the echoes were received (Figure 1[A]), and at only the second attempt I found what looked like a star map—in which it appeared that the probe had come from the double star Epsilon Boötis, in the constellation Boötes, the Herdsman (Figure 1[B]). Arcturus, the brightest star in

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Fig. 1[A] First Van Der Pol Sequence: Evening, 11th October, 1928
(Tentatively identified as an incomplete map of Boötes)

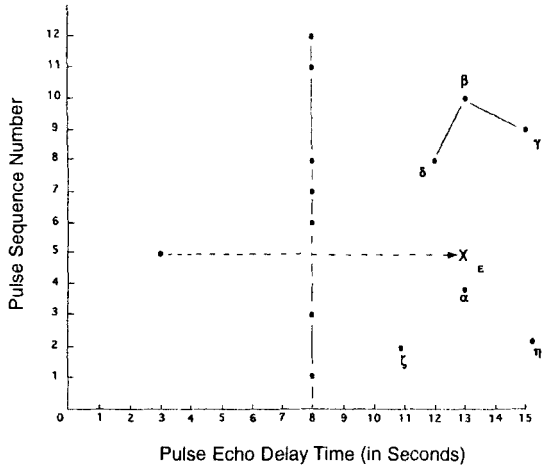
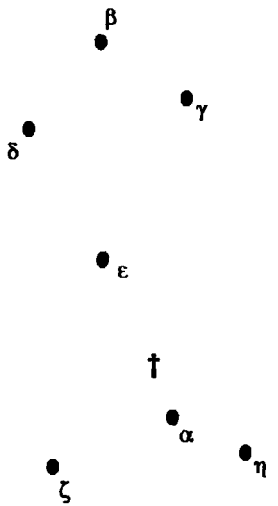


Fig. 1[B] Constellation Boötes, the Herdsman



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the constellation, seemed to be out of place in the map; but on checking, was shown at its place about 13,000 years ago.

Other parts of the supposed message seemed to give the scale of their planetary system, orbiting Epsilon Boötis A, and seemed at first to make sense. Epsilon Boötis A is an orange giant star, and the translation indicated that the probe makers had evolved on its second planet, emigrating later to the sixth when their sun began to expand. But there was a problem: the companion star (Epsilon B) was bright blue, apparently a short-lived sun of spectral type A2. It emerged that the distance given for the star in most reference books was too low, and at the true distance of 203 light-years, Epsilon B really was an A2 star and the orange giant Epsilon A had been an AO, like Sirius—too massive and with too high a radiation output to sustain habitable planets, too short-lived for life to have evolved there. At the same time, more accurate 1920s records were located, and most of the "star map" translations were ruled out—not the "Epsilon Boötis" one, but it too had to be treated as suspect. I withdrew the entire translation,[2] but now it seems I may have gone too far.

Dropping it didn't rule out the space probe suggested by Prof. Bracewell (though he himself has abandoned the idea).[3] James Strong suggested that the probe could be located in either the "Lagrange 4" or "L5" point, also called "Trojan" or "Equilateral" points, equidistant from the Earth and Moon.[4] The dates and times of the 1920s' LDEs showed that the L5 point was at least one source of the effect.[5] Anthony Lawton of the British Interplanetary Society suggested that in ideal conditions the Trojan points could form temporary, stable ionospheres of their own which would generate LDEs[6]; it was reported that I accepted that, but scientists I consulted replied that such clouds would be disrupted by currents in the Earth's magnetosphere, or at other times of the month by the Solar Wind (the constant outflow of charged particles from the Sun). In any case, as the Lagrange points have no gravitational fields of their own, a cloud of charged particles would be scattered by their mutual electrostatic repulsion—unless there was a powerful magnetic or electrostatic field to hold them in place. If this was produced by a spacecraft, I suggested, Lawton might have hit upon the method by which the Bracewell probe generated LDEs—by accident!

Many books and articles said that Lawton conducted an active radio search for LDEs, but in reality he stopped after getting an initial "reply," on the grounds that further transmissions "would constitute a biased experiment." Optical searches of the Lagrange points failed to find anything as large as the Skylab space station, or in a later search, as large as the Pioneer 10 space probe.[7] Meanwhile, however, Epsilon Boötis just would not lie down.

There are several real or suggested Zodiacal star maps, laid out on the ground, which center on Boötes. That's just because the constellation

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Fig. 2[A]

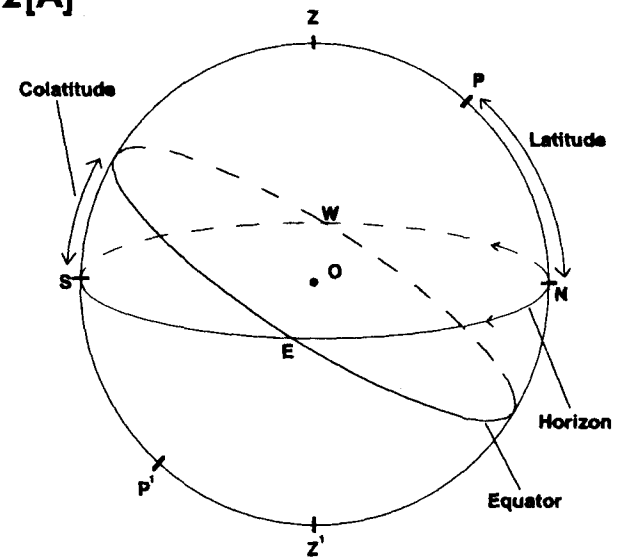
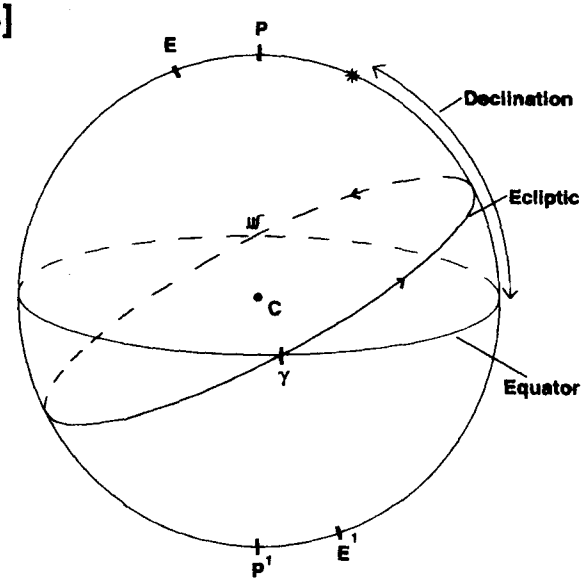


Fig. 2[B]



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contains the pole of the Ecliptic, perpendicular to Earth's orbital plane around the Sun, so any Zodiacal map will be centered on it. But also, we are in Boötes as viewed from Tau Ceti, one of the nearest stars like our Sun, and at *relativistic speeds, Epsilon Boötis* would be a prime navigational reference on the journey here.[8] And there was an even stranger development.

After my book "Man and the Stars" came out,[9] I was contacted by Alan Evans, who was then a captain in British Military Intelligence. He liked the analysis I'd made of Erich von Daniken's claims, where I concluded that Earth had not been visited more than four times, at most. Alan suggested we jointly attempt something still more systematic: if the Earth had ever been visited, our aim would be to find proof. He stressed that his was purely a personal interest, which had to remain confidential, but as he's since left the Army that no longer applies.

We tightened up my approach into four categories of possible evidence. Category A would be our objective, an artifact of unquestionably extraterrestrial origin. Category B would be optical or electromagnetic anomalies pinpointing such an object (like the Tycho monolith in *2001*); Category D would be the "von Daniken material" of legends, drawings, etc.—which were no use except in suggesting areas to search for other types of evidence. But Alan pressed me to include a new category, C, which would be anomalous astronomical alignments in man-made structures—anomalous because they revealed knowledge which the builders should not have had. For example, on high-resolution photographs of Stonehenge, he had identified markings which seemed to indicate *galactic* alignments.

I wasn't impressed at first. I had studied megalithic astronomy under a leading expert, Prof. Archie Roy, and seen nothing unusual; there was no correlation even with Category D; and when I did the calculations, the markings Alan had found didn't seem to be galactic. At the time when he put this to me, circa 1975, it was supposed that Stonehenge I was built in 1800 B.C., near the end of the Stone Age in Britain (not many people realize that Stonehenge was one of the *last* megaliths), with Stonehenge III, the inner circle, still later in the Bronze Age. Soon afterwards, however, Archie Roy himself published an article from which we learned that the radiocarbon dating scale had been revised, pushing Stonehenge I back from 1800 B.C. to 2700 B.C. Further revision made it c.2840 B.C., and that radically changed the whole situation.

Archaeoastronomy at Stonehenge

Figure 2(A) shows the celestial sphere as viewed by an observer in the northern hemisphere. The altitude of the pole above the northern horizon is equal to the observer's latitude, and the heavenly bodies circle around it, parallel to the equator, with the daily rotation of the Earth. The altitude of a body above the horizon, and its azimuth measured along the horizon from the north point, change constantly as the Earth turns. Apart

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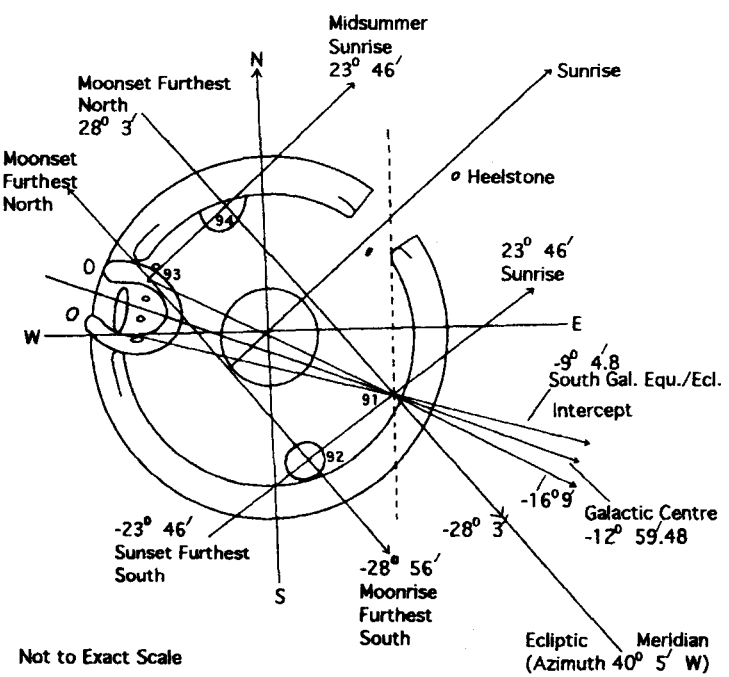
from the circumpolar stars, which are too near the pole to rise and set, everything else rises in the east and sets in the west at a position which is determined by the *declination* of the object, measured from the equator (Figure 2[B]). Where the declination equals the observer's latitude, the star passes overhead once a day.

Horizon positional astronomy was all the Stonehenge builders could do (Figure 3). Stonehenge I incorporated the ditch, bank, Avenue, Heelstone and Station Stones; what most people think of as "Stonehenge" are the great sarsen archways of the inner circle, Stonehenge III, erected in the early Bronze Age. It's universally agreed that the Stonehenge Avenue and the later structure both mark the midsummer sunrise. But few archaeologists agree with Gerald S. Hawkins that the "Station Stones" of Stonehenge I mark the extreme positions of the Moon's 18.6 year cycle[10]; and still fewer agree

Fig. 3 Stonehenge Alignments c. 2840 B.C. Without Refraction or Parallax Corrections



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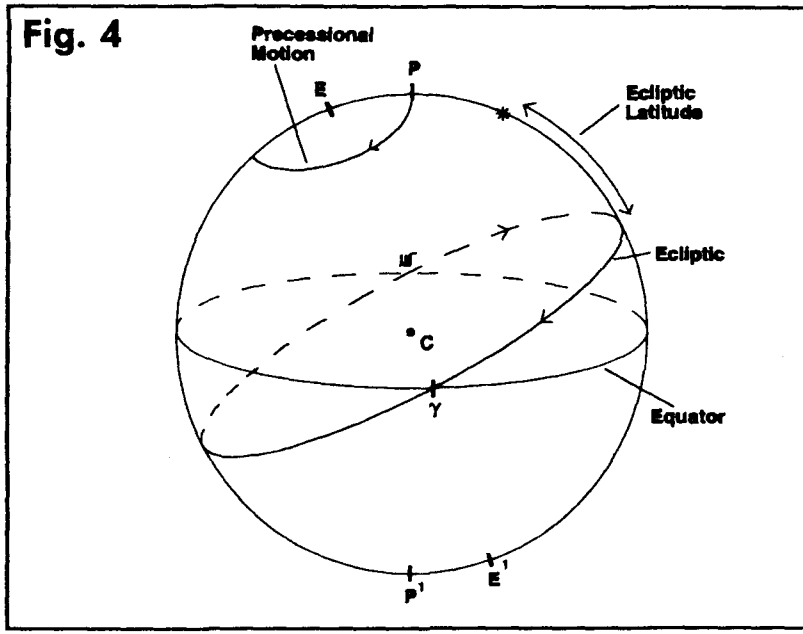

with Prof. Alexander Thom, that the megalith builders had a sophisticated program of lunar observatories, spread over the British Isles.[11] Personally, I'm convinced; I've even built a modern megalith, under the auspices of Glasgow Parks Dept., to compare its performance with the prehistoric sites, and demonstrated that high precision *could* have been achieved by naked-eye observations.[12]

When it comes to star alignments, the position is more complex. Because the Earth's equatorial plane doesn't coincide with the Ecliptic, nor with the orbit of the Moon, the combined pulls of the Sun and Moon on Earth's equatorial bulge cause the Earth's axis to "wobble" around the Ecliptic Pole with a period of 26,000 years (Figure 4). Thirteen thousand years ago the north pole star was Vega in Lyra, and 5,000 years ago it was Thuban in Draco, at the time of Stonehenge I. The pull makes the equator move around the Ecliptic, constantly changing the position of the Vernal and Autumnal Equinoxes (Precession of the Equinoxes). As a result, a star's declination is constantly changing—likewise its Right Ascension, which is measured from the Vernal Equinox along the equator, in the same direction as the Sun's motion on the Ecliptic shown by the arrows in Figure 2B.

Astronomers can partly get around the problem of coordinate change by giving star positions in Ecliptic Latitude, which remains constant, and Ecliptic Longitude, which changes smoothly with time. But for coordinates that are fixed over human timespans, even the spans of civilizations, we have to use galactic latitude and

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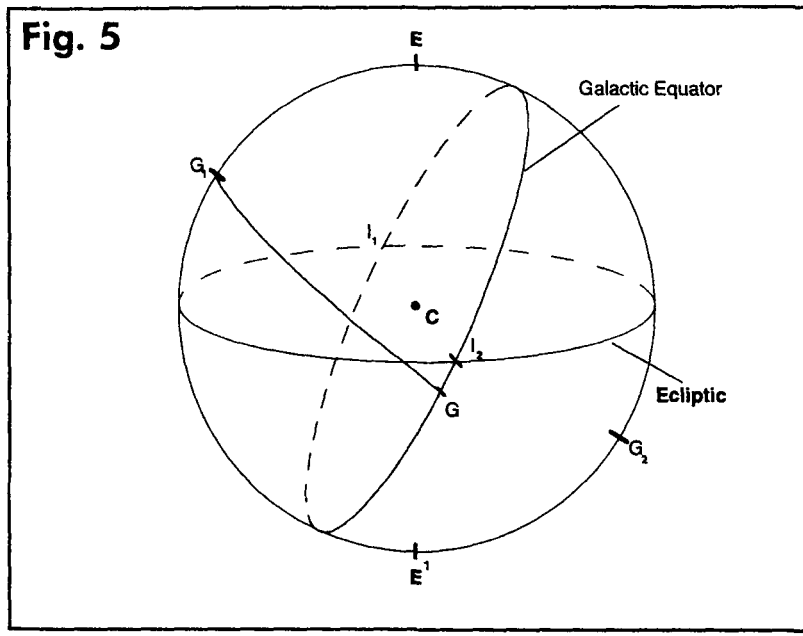

longitude, whose zero point is the galactic center and whose pole lies on the perpendicular to the plane of the Milky Way (Figure 5).

On the high-resolution photographs of Stonehenge, Alan Evans pointed out a curious horseshoe-shaped marking on the northwest, cutting the bank and overlying Station Stone 93 (Figure 3). It's not on official plans and may not be significant: the photos were taken in 1966, eight years after one of the fallen trilithon archways was re-erected, and the "horseshoe" coincides at least in part with the tracks of the heavy machinery used then. We have located a smaller version of it in a prewar aerial photo, but it's still historically suspect. Still earlier photos, taken by balloon, show a similar but different pattern.[10] But the relationship the horseshoe pointed out to us was real enough.

As Figure 3 shows, the orientation of the horseshoe is to the rising point of the galactic center, and of the galactic equator's intersection with the Ecliptic, c.2840 B.C.. Even more extraordinarily, it turns out that the declination of the North galactic pole was then equal to the latitude of Stonehenge. Consequently, when the galactic center was on the horizon, the galactic pole was in the zenith and the galactic equator coincided with the horizon (Figure 6).

It would be remarkable if that was a coincidence, but if it's *not* coincidence, it's an extraordinary finding. The galactic center is 27,000 light-years from us and hidden behind dense clouds of absorbing dust in the inner regions of the Milky Way, so its location cannot be pinpointed visually, but only with a radiotelescope. Until you know exactly where the center is,

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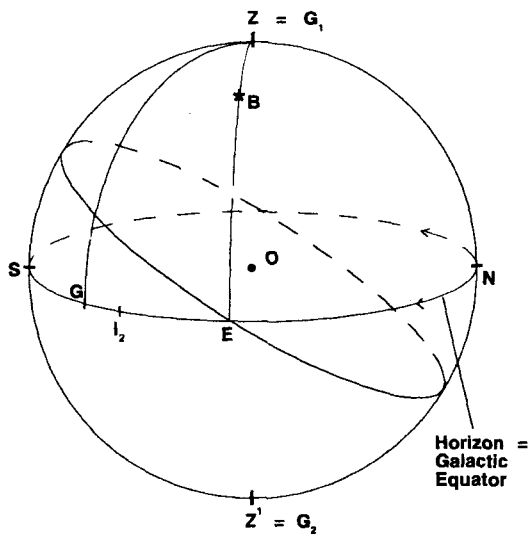
you can't determine the true plane of the galactic equator and the true positions of the galactic poles. At the Moscow General Assembly of the International Astronomical Union in 1958, new values for the positions of the poles and the center were officially adopted, based on the distribution of neutral hydrogen in the inner Milky Way and study of the radio source Sagittarius A. Previous optical studies had suggested the center was in Scorpius, so it was a big change. Maps using the old galactic coordinates were still on sale as late as 1963, with addenda giving corrections to the new system.[13] Yet apparently the builders of Stonehenge knew exactly where the galactic center was, or took their cue from something or somebody who did.

In this context, why are galactic coordinates so important? Imagine a spacecraft traveling between the stars. Its attitude sensing platform might be oriented to its home world—its own Right Ascension and declination—or its home planetary system, its own Ecliptic coordinates. But neither will be relevant when it enters our Solar System: the only coordinate system common to its system and ours is the galactic one. In any maneuvers or landings it made here, you would expect it to navigate in galactic coordinates; and if it chose a landing site on the declination of the galactic pole, then once a day the azimuth and altitude of any star, measured from the rising point of the galactic center, would correspond to its galactic coordinates, like B's in Figure 6. If the spacecraft's attitude sensing platform was fixed, built into

Fig. 6 (Variant of 2[B])



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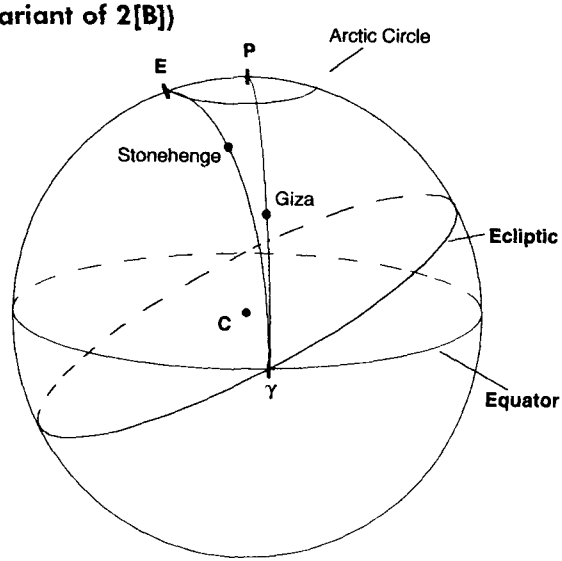
its structure, it would still be correctly lined up with the sky once a day.

So if the horseshoe marking is modern, its "prehistoric" alignment might be a curious coincidence. What looks more likely, on Figure 3, is that there was something in the center of Stonehenge I, which was gone by the building of Stonehenge II and III. In fact, after Stonehenge I was built, around 2700 B.C. the site was abandoned for over 200 years while the same Neolithic people built the much larger complex of Avebury and Silbury Hill, due north of Stonehenge itself.[14]

What would annoy archaeologists, who don't even admit most "conventional" archaeoastronomy, is the suggestion that the Stonehenge orientation is galactic at all. I looked for an optical marker, something which would have let the builders create Stonehenge without knowing about galactic coordinates or even without a spacecraft necessarily being there. And I found one, but it didn't exactly make the alignments less controversial. The star which had the same declination as the North galactic pole in 2840 B.C., equal to the latitude of Stonehenge, was Epsilon Boötis itself.

It was so hard to believe, when I'd abandoned the Epsilon Boötis "translation" of the radio patterns, that I arranged to see for myself, twice in the planetarium of the Jewel & Esk College in Musselburgh, then all over again at the much larger one in Armagh. It feels extraordinary to see such findings, worked out with long pages of calculations, simulated on the planetarium "sky" overhead. With the date set for

Fig. 7 (Variant of 2[B])



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2840 B.C., at the Stonehenge latitude, the Milky Way really does line up with the horizon once a day and Epsilon Boötis really does go through the zenith as well, earlier each day.

The Ecliptic and the Pyramids

But Alan Evans has a strong intuitive grasp of spatial relationships, and he had found another which he wanted me to verify. Projected north, the alignment of Station Stones 94-91, and 93-92, meet the Arctic Circle at a tangent (Figure 7). As the Earth turns, when the Ecliptic Pole comes overhead at that tangential point, those stones mark the Ecliptic Meridian passing through Stonehenge. And when that line is projected south, it meets the equator due south of the Egyptian "Memphite Necropolis," containing the great pyramids of Giza. Putting it another way, the Ecliptic meridian through Stonehenge meets the prime meridian of Giza at the equator. And Alan realized this created another extraordinary relationship: at midsummer sunrise at Stonehenge, the one alignment there that even the sceptics recognize, the Vernal Equinox was on the prime meridian at Giza.

That one can't be verified optically in a planetarium with the same certainty, because the tilt of the Earth's axis to the equator is not constant, varying between 22 and 24 degrees.[15] In 2840 B.C. it was near maximum, and has since declined by over half a degree. None of the planetaria we've used could allow for that, but the relationship is extremely close, even today. I had my calculations confirmed by Paul Benson, then curator of Airdrie Observatory; and more recently Alan had it all done from scratch by Peter Tyler (of the Positional Services Dept. of GECO-PRAKLA, Oslo, a leading international seismic survey company), who confirmed that around 2700 B.C. the alignment was close. In his calculations the margin of error was less than one-fifth of a degree; my own put it even closer.

The oldest features of all at Stonehenge lie over the brow of the hill, northwest from the circle. The "Car Park Post Holes" held huge vertical tree trunks or totem poles, and radiocarbon dating has them as old as 8000 B.C.[16] Even that is a mystery: it's believed that the first Mesolithic settlers reached Britain long after the Ice Age, around 6000 B.C.[17] It's possible that the weathering on the Bluestones of Stonehenge II, which were brought from the Prescelly Mountains in Wales, makes them older and perhaps once erected elsewhere; that could have been any time after they were first exposed to the atmosphere around 12,000 B.C.[18] The ice sheets never covered Stonehenge and Prescelly, even at their greatest extent in 20,000 B.C.,[15] but even the 8000 B.C. Post Hole date is a problem for archaeologists.

As Alan Evans pointed out, the Ecliptic Meridian passes through the line of Post Holes,[19] on the line of stones 92-93 (Figure 3). If there really was a spacecraft, and its attitude sensing platform was relating our ecliptic and celestial coordinates to the galactic ones, then if galactic alignments determined the latitude of the touchdown site on Salisbury Plain, then the ecliptic ones show an intention to go

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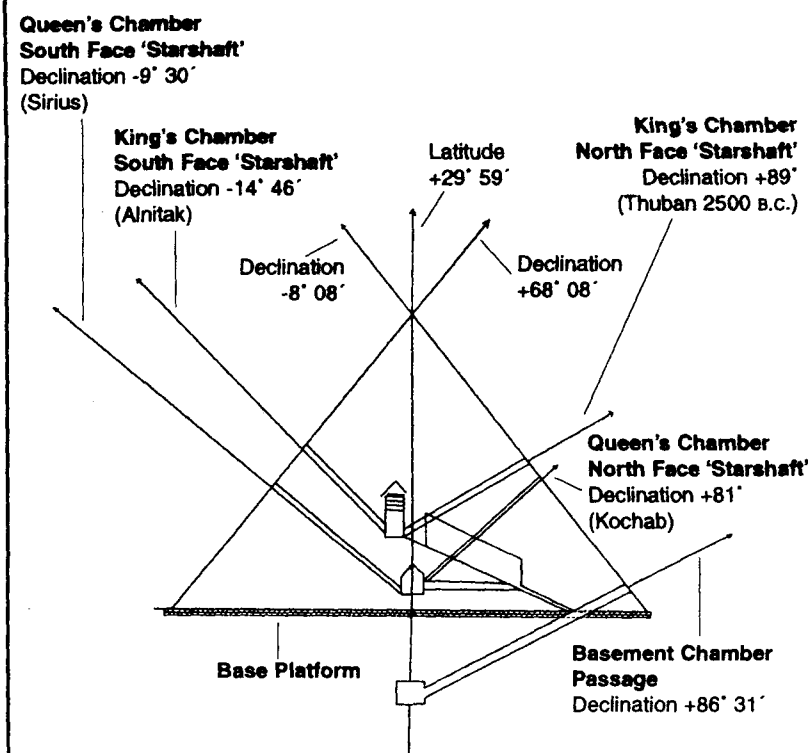
Fig. 8 The Great Pyramid



to Egypt *afterwards*, which determined the longitude and brought it down at the future site of Stonehenge I—which raises the interesting speculation, were the Posts still standing at that time, as if to mark the landing place? Below, we'll see some reason to think that might have been their intended purpose, at least.

The next question is, are any of the Stonehenge galactic alignments repeated at the Old Kingdom Egyptian pyramids? The Great Pyramid is the obvious place to look, but doesn't show anything galactic (Figure 8). The interesting one, which lies even closer to the Ecliptic meridian, turns out to be the *first* pyramid: the Step Pyramid at Saqqara, whose longitude is one-tenth of a degree east of Giza's. It was the first stone building in the world, created around 2650 B.C. by the architect Imhotep for the pharaoh Djoser (Figure 9). Imhotep changed the design several times during construction, and some archaeologists suggest that

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he filled in the steps with rubble and faced them with limestone, to give the illusion of a true pyramid.[27] (The next two, intended to be true pyramids, were partial failures before the Great Pyramid's builders got it right.)

And if the Step Pyramid was originally faced in that way, then as nearly as we can measure it, a perpendicular line up the north face met the prime meridian at the declination of the southern intercept between the galactic equator and the ecliptic, marked I_2 in Figure 5—one of the same alignments we'd found at Stonehenge. But, extraordinary as all this was, we were still a long way from our goal; we knew what we wanted to do next, but it was beyond our financial means. So we withheld publication, until April 1996, when a whole new situation developed.

The Pyramids and the Sphinx

Archaeoastronomers are in some ways remarkably conservative. Their own ideas about science in ancient society are rejected by many astronomers and most archaeologists; in consequence, they refuse to entertain any more controversial notions, such as a previously unknown civilization on Earth, or extraterrestrial visitors. I suggested to the 1996 Edinburgh International Science Festival that we organize a seminar on "Heresies in Archaeoastronomy," examining the ideas that were too controversial even for archaeoastronomers to consider. Prof. Archie Roy gallantly agreed to introduce it, and not surprisingly it drew a capacity audience. Naturally, Alan Evans was there to present his paper on the Ecliptic meridian.[20]

Another participant was Robert Bauval, whose book *The Orion Mystery*[21] suggested that the three giant pyramids of Giza not only incorporated star alignments in their so-called "air-shafts" (Figure 8), but represented the stars of Orion's Belt mapped on to the landscape. Robert had now collaborated with Graham Hancock on a new book, "Keeper of Genesis," based on the possibly great age of the Sphinx. The apparent evidence of water erosion suggests that the Sphinx and its flanking temples were built as long ago as 10,500 B.C., when Egypt last had a wet climate toward the end of the Ice Age.[22]

The Vernal Equinox was then in the constellation Leo, and Robert and Graham suggest that the Sphinx was built to face its counterpart in the sky. Furthermore, the orientation of the Belt stars to the Milky Way corresponds to the Pyramids in relation to the Nile—not when they themselves were built, but when the Sphinx was carved out 8,000 years before.

In 10,500 B.C., as far as we know, the Nile delta was inhabited only by hunter-gatherers, wholly lacking the technology to carve out the Sphinx and build the temples in 200-ton blocks. In a previous book Graham Hancock tried to get round this by suggesting a world-spanning civilization, unknown to us, which lasted over 8,000 years and was based on the coast of Antarctica.[23] It used to be thought that the Antarctic coast was ice-free during the Ice Age in the northern hemisphere; however, that idea had been attacked by the early 1980s[15] and more recent Antarctic

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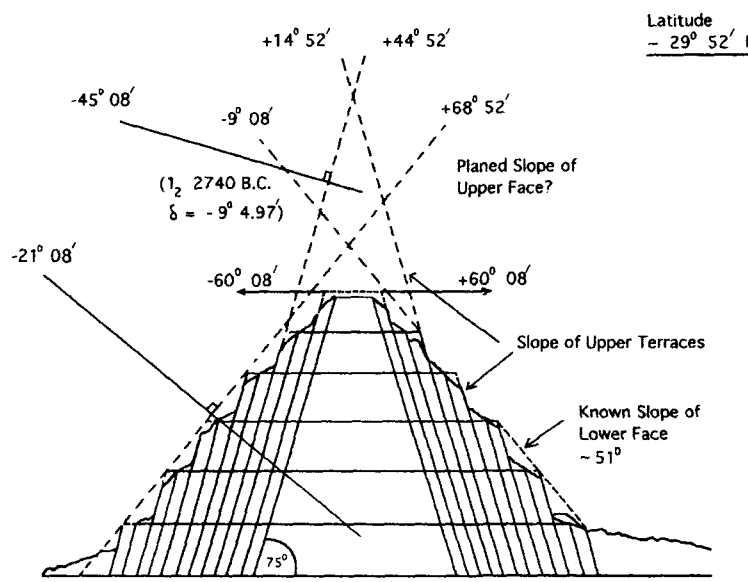
Fig. 9 Step Pyramid of Djoser c. 2650 B.C.
(Declinations corresponding to side angles)



Some archeologists believe the Step Pyramid was to have been complete, but an earthquake caused the upper slopes to collapse, so terraces were substituted. Others have suggested that the steps were filled in with earth and covered with limestone slabs to give the illusion of a complete pyramid.

surveys continue to stack up evidence against it. And it's very hard to believe that such a world-spanning, long-lasting civilization would leave so little evidence behind.

Graham couldn't attend the Edinburgh seminar, but he and Robert were both in Glasgow three weeks later and I was able to arrange a continuation, in which we went to the planetarium at the College of Nautical Studies. First I showed them what Alan Evans and I had discovered, and when they saw the galactic alignment at Stonehenge I, Robert Bauval made an extraordinary remark, which I'll come back to in a moment.

Then, holding the date c.2700 B.C., we shifted to the latitude of Giza, and verified Robert's calculations for "The Orion Mystery." It had never occurred to him to do so in this way, and he was as moved as I had been at seeing the layout of the ancient skies for himself—especially since everything he had calculated was confirmed. So too were the "Keeper" calculations for 10,500 B.C., Leo, Orion and the Sphinx, when we moved the setting back to

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that date. When the Sun rose below Leo at the Vernal Equinox in 10,500 B.C., Orion was on the meridian, and the orientation of the Belt stars to the Milky Way matched that of the Giza pyramids to the Nile 8,000 years later. Whatever its significance, that claim is true: we saw it with our own eyes, reenacted.

But when I showed the galactic orientation of Stonehenge I, and explained what it might mean in terms of an ET landing, Robert's show stopping remark was, "It's the same at Giza in 10,500 B.C., we just didn't know what it meant." Now the time had come to verify that. Once again, if it was true at all, it would be true once a day, every day, at that latitude and date. So, just by letting the stars wheel on, we verified it at once. At Giza, in 10,500 B.C., due to the effect of precession, the same galactic relationship existed as at Stonehenge c.2840. Once a day, the sky took up the same Figure 6 configuration, with the galactic pole in the zenith and the plane of the Milky Way coinciding with the horizon. We saw it for ourselves: like a galactic "compass rose" at each location, but separated by eight millennia in time.

But in that case, what was happening then at Stonehenge? We kept the date at 10,500 B.C., and the custodian took the planetarium "back up" to the latitude of Stonehenge. Having no idea what to look for, once again we just let the stars wheel freely around, through a normal day. And Epsilon Boötis went through the zenith! It was doing that daily in 10,500 B.C., when the galactic alignments were in force at Giza, and the effect of precession on it, over the next 8,000 years, was to bring it *back* to the Stonehenge zenith, as an optical marker for the same galactic alignments at Stonehenge itself when Stonehenge I was created. Unless it's all coincidence, it can only mean that the events of 2840-2500 B.C. represented a *return* to both sites. And the first, 10,500 B.C. date goes along with the "approximately 13,000 years ago" given by Arcturus's position in that first map of my 1973 "translation," Figure 1(A). If that map meant anything, it would have to be as a time marker, not a navigational reference as I thought.

It still isn't Category A evidence, the artifact of indisputably extraterrestrial origin, nor the Category B anomaly that leads us to it. In this context, Category C might stand for "circumstantial." But I can't believe that all those circumstances are coincidental; these multiple high-tech astronomical alignments are, in my opinion, the best evidence for Past Contact ever put forward. The synergistic combination of our research with Bauval and Hancock's has convinced me that we're on the track of something big.

It leaves two questions to answer:

1. What about the Green Children?

In the September 1996 *Analog* I suggested Past Contact in 12th century England. Is there a connection? Yes, there's one I pointed out in that article. The latter half of the 12th century A.D. featured the most violent solar activity since the Bronze Age, indicated by aurorae, carbon-14 ratios, tree-rings etc.[24] And that previous peak was a triple one, between 2700 and 1800 B.C., cov-

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ering the building of Avebury, the Pyramids, Stonehenge II and Stonehenge III. It may be coincidence; but it's interesting that it was the case in both historical periods which I'd consider candidates for Contact events.

2. What about the Space Probe?

Optical searches of the Lagrange points in the late 1970s found nothing. But in April 1995 Dr. Duncan Steel drew attention to the discovery, at Kitt Peak in Arizona, of a most unusual asteroid designated 1991 VG. In December 1991 it passed Earth at a distance of only 485,000 miles. Its diameter was estimated at 9-19 meters, assuming that it was made of one of the more common asteroidal rocks. However, observations at closest approach suggested "strong, rapid brightness variations which can be interpreted as transient specular reflections from the surfaces of a rotating spacecraft."[25]

During the space age 1991 VG would have passed only twice before, in February-March 1975 and in mid-1958—possibly 1959, if the 1975 approach altered the orbit. Nothing that big was launched in 1958-59, nor in 1975; the European Helios 1 was launched in December 1974, but its carrier's upper stage did not escape from the Earth into orbit round the Sun. Perhaps, instead, 1991 VG was orbiting Earth then, until it was "discovered" and moved away before anything more serious happened.

But when it comes back in 2008, let's hope that a major attempt is made to look at it. The solar-sailing "Comet-chaser" Gordon Ross and I suggested here would be ideal,[26] but it can be done by conventional means: NEAR, the Near Earth Asteroid Rendezvous, is to orbit the asteroid Eros shortly, Europe's Rosetta probe is to do the same with a short-period comet after 2000, NASA's Deep Space 4 will reach Comet Tempel in 2006, and a Japanese probe will reach Asteroid Nereus the same year. 1991 VG should be next on the list. ■

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Jerry Oltion

WHY DIDN'T YOU THINK OF THAT BEFORE WE LEFT?

There's such a thing as too much togetherness. . . .

We had already been in trouble for a couple of weeks before we realized it. We were up to about 90 percent of light-speed by then, coasting along toward Alpha Centauri in our skeletal framework of a starship and feeling pretty smug about life.

Well, OK, not "life," since all three of us had traded in our bodies to become standing waves in Tilbey's experimental mass eliminator, but we were feeling pretty smug all the same. We had outsmarted the UNASA bureaucrats who had tried to confiscate our starship once we'd proven the technology, and whether they liked it or not we were going to be humanity's first emissaries to the stars. We'd worked for it, we'd lived for it, we'd *died* for it, and by god the honor was going to be ours.

Or so we thought, right up until the moment Tilbey began singing old

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Necrotic Nuisance songs in squeaky falsetto.

We were in the "day room," which was really just the payload housing for the original Orion class cargo rocket we'd cannibalized to make our starship, the *Spook*. Since we were the payload on this flight, we figured using that for our living space would be appropriate. We'd put our book readers and video displays in there, and cut windows in the walls so we could see out, but we hadn't bothered to glass them in and pressurize the space since we didn't need to breathe anymore. That meant Tilbey's song came directly through the mass eliminator interface, straight into our holographically stored minds.

I heard Liam grunt the way he does when he's disgusted with something. I looked up from the comp screen on which I'd been reading news from the Solar System—two years old due to the speed-of-light lag, but still fresh to me—and saw him looking at Tilbey. Liam had been reading, too—probably another military action/adventure novel about the Ganymede uprising. A frown spread across his milky white face as he watched Tilbey, who was tinkering with another of his unfathomable electronic projects on the workbench he'd set up inside the now-useless airlock.

"That's not funny," Liam said.

Tilbey stopped singing. "What?" he asked.

"'Deathwish' may not have been the best song of the twenty-first century, but you don't have to mock it like that."

"Like what?" Tilbey cocked his head, puzzled.

"Falsetto. Screwing with the lyrics. It's 'Europa's icy shores,' not 'You grope its spicy whores.'"

Tilbey reached up to scratch his head, a habit left over from the old days when he still had a head to scratch. "I . . . I don't think I know that song. By either set of lyrics."

"You were singing it just now," Liam pointed out.

"Must've been subconscious, then." Tilbey said. "I didn't even realize I was singing anything. How does it go?"

Still frowning, Liam cleared his throat—another habit left over from the old days—and sang, "'The shuttle's engine sprung a leak/A hundred miles high/We knew . . . '" He paused. "'We knew . . . ' something, something '. . . we were apple pie.' No, dammit, it's 'we were gonna die.'" He turned completely around, holding onto the grab handle on the wall beside his reader so he wouldn't drift away. "What the hell's going on here?"

"What do you mean?" Tilbey said. "You forgot a song. Big deal."

"It is when I wrote it. And performed it about twenty thousand times in concert. That song was burned into my brain."

I looked at Liam in surprise. He'd been a janitor on *Freeport* when we first met him. Ninety years old if he was a day and shuffling along even in zero-*g*. I knew he'd been a fighter pilot when he was younger, but even so I couldn't imagine him in a band called Necrotic Nuisance, jumping around on stage and singing about apple pie—or anything else.

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"When were you in a band?" I asked.

"When I was . . . " he began. "When I was . . ." He looked to the left, and then the right, as if he might be able to catch the elusive memory, but he couldn't track it down. "Damn it, that's gone too."

"You were sixteen," Tilbey said. "Summer of '23. You and Gina and Tweed rented a—how do I know this?"

He parked the test probe he'd been using back in its loop on his tool board and pulled himself into the day room. The motion caught my attention, because Tilbey *never* put his tools away. We'd tried and tried to train him, and to make him more careful about tripping over—and through—things, but he seemed physically incapable of neatness. We'd had to Tilbey-proof our living space the way new parents kid-proof an apartment, and we'd had to put nets up around the windows to keep his things from drifting off into space. But now that I looked, I saw all his tools arranged neatly on the board, and the gadget he was working on clamped down as well.

I got up from the comp to take a closer look, but when I went to push off from the table my hand slipped and went through the monitor, which promptly shorted out and spit sparks out the back. "Hell," I said. That was the second time today I'd blown something up by moving through it. I was getting as clumsy as Tilbey.

Then the implication hit me. I *was* as clumsy as Tilbey. "Uh oh," I said. "I think we're in deep trouble."

The problem had to be in the mass eliminator. It used holographic memory to store the information that described everything it duplicated; theoretically that had near-infinite capacity, but in practice there were limits. The more data you stuff into a holographic web, the less definition you get between similar items, and since the beginning of our trip we'd done little besides squirrel away information.

What else is there to do on board a starship? You read, listen to music, watch movies, tinker. You learn. And everything you learn gets stored in your brain, which in our case was an ever-more-densely packed one-teralink synaptic neural net. Memories that were similar to one another were starting to blend together, just like in an old person's brain. And it wasn't restricted to memories, either. The information that made up all three of us, from our hat size to our habits, was being stored in the same device. I had inherited Tilbey's awkwardness, and who knew what else?

"Can't we just hook up another web and keep going?" I asked Tilbey. We had gathered in the belly of the ship, the safest, most heavily shielded area, the best place to store the gadget that kept us going. As I looked at the desk-sized mass eliminator with its holographic control panels sticking out so we wouldn't have to touch anything we could short out, I realized that the image in my mind was being stored inside that very cabinet, adding yet another degree of complexity to the information web. I closed my eyes, felt ridiculous, and opened them again. If we were that close to

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the edge, we were doomed anyway.

"It's not that simple," Tilbey said. "I can't just splice on memory any more than you could just splice an extra head onto a live body and expect it to work. It's got to be integrated into the design."

Liam snorted. "Well, you'd better start redesigning this piece of junk, then. We can't go on cramming more memories together. I mean, I might start remembering things from *your* life, and I don't think I could handle that." He was putting up his usual sarcastic front, but I could hear the fear in his voice. Brain cancer! Dementia! And maybe he was afraid of what we might remember about his past. He'd been in a rock band around the millennium, after all; he must have done a lot of things back then he'd just as soon people not know about now.

"You *want* me to tinker with it?" Tilbey asked incredulously. After the first few near-disasters involving Tilbey and essential ship's systems, Liam had forbidden him to touch anything vital.

"He's got a point," I said to Liam. "This is *us*. If he blows it up, we're dead."

"We're dead already," Liam growled. He opened one of the cabinets full of replacement parts, closed it, and said, "Why don't we have a backup mass eliminator?"

Tilbey stuck an arm through the wall to hold himself in place. The overhead lights flickered for a second until he shifted over to avoid the embedded switch wires. "Why don't people have spare bodies?" he asked. He answered his own question. "Because if the first one quits working, they're out of luck anyway. A clone would be its own person the moment it was born. Same situation here. I could build another mass eliminator, and even imprint it with the information in the first one's memory. But the moment I switched it on we'd just get another set of astral astronauts. And a corresponding drain on our power supply."

"What about separating us out into different machines?" I asked.

"That would have been a great idea if we'd thought of it from the start," Tilbey said, "but we didn't. To be perfectly honest, I never even considered the possibility that we could fill a teralink web in less than a millennium. I don't think we're actually filling it up now, to tell you the truth. I think we're just overlaying similar thought patterns and then having trouble pulling them out again. But it's the same problem either way; we're trying to use the same memory device for three different people. The big question is, how are we going to separate things out again?"

"You're the electronics genius," said Liam. "You tell us."

Tilbey tried to. Over the next few days he breadboarded another unit and started experimenting with it, but our deterioration continued with every new thing he learned. Liam and I quit reading, and I even spent most of a day watching the public video feed from Earth, hoping to lower my intelligence a notch or two, but it didn't seem to help. The only noticeable result was that Tilbey began humming the theme to "Amazon Women from

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Venus" instead of Liam's old music.

Something else I saw stuck with me, though, and after I mulled it over for a while I decided to share it with the others.

"You know they're calling this mind-recording stuff the 'Tilbey Effect' back home? They're using it to record people's thought patterns and transfer them into animal bodies for research. When the test subjects get back into their own bodies, they can remember some of the things they experienced from the animal point of view."

Tilbey laughed. His test equipment completely obscured him from sight, but his voice still came in clearly through our link. "I would never have thought of doing that with it," he said. "I built it so I could make a massless spaceship. I never even considered using it to talk with dogs and cats. That's amazing. What sorts of things do they think about?"

"Who?" I asked.

"The dogs and cats."

"Who *cares* about the dogs and cats?" Liam said. "If Danny's right, then they've already figured out how to shift minds back and forth from place to place. If we can learn how they do that, we could do it to ourselves."

Tilbey stuck his head around the side of his equipment. "Like I told you earlier; I could copy us anywhere you wanted to go. It's separating us from each other that's the problem."

"They must have some way to keep the cat and the researcher separated when they transfer them," Liam said. "Don't they, Danny?"

I tried to remember. I came up with a fuzzy image of a cartoon cat eating a bird ten times its size, something I vaguely remembered from childhood until I realized I was a black kid at the time. We were all white as . . . well, white as ghosts now, but that had to be one of Liam's memories. Apparently it was similar in some way to the one I was looking for, but it wasn't what we needed.

"Uh, actually, I don't remember that bit," I said.

"Pointer fault," Tilbey said. He'd taken to saying that in a sing-songy voice when one of us dredged up the wrong response.

"Well, *remember*, damn it," Liam commanded me. "If we knew how they do it, we could do the same thing here and our problems would be over."

"Wrong," said Tilbey. "I already know how to keep things separate if they start out that way. That part's simple. You just load them into separate memory nets to begin with. Our problem is we didn't think to do that until it was way too late."

I said, "Then what we need is a way to switch one or another of us off for a minute. If we could do that, we could read the state of the system and subtract out the difference, and that would be the pattern for whoever was switched off at the time."

Tilbey sighed in exasperation. "You still don't get it. There *aren't* three separate beings anymore. We're all one entity now."

Liam snickered.

"What?" I asked.

"How does a Buddhist order a hot dog?"

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"Huh?"

"It's a joke."

"Oh. I dunno, how?"

"'Make me one with everything.'"

I chuckled, but Tilbey howled with mirth. "Wow, that's great!" he said. "I've never heard that one before!"

Liam shook his head. "You 'roid, I *heard* it from you."

"Oh."

"Pointer fault," I said.

We went back to what we were doing, which in my case wasn't much. I was bored with video, didn't want to get into an argument with Liam, and I felt too clumsy to trust myself helping Tilbey. So I stretched out and stuck my feet through the deck, closed my eyes, and tried to nap. It wasn't physiologically the same as sleeping had been when I was alive, but maybe it would take up fewer resources.

"That's it!" I jerked forward in my excitement, pulling free of the floor and tumbling head over heels into the ceiling light, which exploded with a spectacular flash.

I caught myself before I plowed on through the ceiling. "Sorry," I said.

"This had better be good," Liam threatened. The pale glow of his book reader and Tilbey's work light provided the only illumination in the day room now.

I swallowed vacuum. "I hope it is. Look, what if Liam and I both go to sleep, and Tilbey records the system that way. Then Tilbey and I go to sleep and you record that. Then you guys go to sleep and I record that. When we were done, we'd have three separate minds, wouldn't we?"

"Oh, sure," Tilbey said sarcastically. "Each with two spare subconscious components influencing every aspect of their psyche. Asleep doesn't mean 'off.'"

"Well, what does, then?" I demanded.

"Go trip over the main power line and you'll find out," Tilbey replied. He was sounding like Liam now.

He'd meant to shut me up, but his words triggered another memory, a true one this time. I was back on the *Intrepid*, the Earth-Mars cargo ship Tilbey and I had served on together when we were alive, and for a while afterward. Right after I'd died and been captured by Tilbey's prototype gadget, our navigator, Gwen, had killed the power to it, not realizing what would happen to me when she did.

What happened was nothing. Absolutely nothing. I went where dreams go when you wake up.

But when she flipped on the power again, I came back. The information pattern that defined *me* had not dissipated. We had proven, by accident, what most people suspected all along: some indefinable part of us persisted after death, some part that the mass eliminator latched onto when it created its shadowy copies of the original article.

Which meant that down on that very basic level, we were still three separate individuals.

"All right, then," I said. The spectral hair stood up on the back of my spectral neck as I thought out the implications. "Here's what we can do."

Looking at your own ghost is not an experience I'd recommend. I didn't even like mirrors since my untimely

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demise, but to see an animated phantasm with my features on it, pale and translucent and adrift in zero-*g*, was something I could definitely have done without.

He couldn't even communicate at first. Just mouth "Man, you look strange," at me, which was pretty much what I was thinking about him. Then Tilbey patched a comm link between the original mass eliminator and the duplicate he'd just turned on and we were able to speak. All six of us, since Tilbey and Liam each had a doppelganger of their own.

"Hi," I managed.

"Ohmygod, ohmygod, I'm the duplicate!" the other me cried. Then he grinned. "Sorry. I just had to say that. I mean, how many times does a person get the chance?"

"Let's get this damned show on the road," both Liams said in unison. Neither one smiled at the coincidence.

Tilbey A and Tilbey B just looked at one another for a long moment, and then Tilbey B said, "Boo." Tilbey A flinched, and we all laughed.

"Liam's right," I said. "Let's get moving." I reached out to grasp the hand of my duplicate for a good-bye handshake, but we slid right through each other with only the faintest resistance. We both knew that's how it would be—when something that's only half there meets something else that's only half there, the result is a quarter of the normal interaction—but it was the thought that counted. "Bye," I said. There should have been more to discuss, but if this worked the way we hoped it would, anything we told each other would just be wasted words. He didn't really exist, not down at the basic level on which existence mattered. He was just an echo. Either that or he existed just as well as I did, and we'd have plenty of time to hash things out when I got back. We'd find out soon enough. I turned away and pushed myself out through one of the holes in the wall into interstellar space.

We'd installed the second mass eliminator in the landing craft. I went in through the airlock, not trusting myself to miss any vital electronics if I slipped in through the hull, and positioned myself inside the magnetic cage that would hold me in place during acceleration.

"Command, undock," I said to the navigation computer. I felt a bump, and the lander drifted away from its mooring. "Command, accelerate along current flight path at twenty *g*s for one hour." That would put me almost 800,000 miles away. Over four light-seconds; probably overkill, but we were operating by the seat of our metaphysical pants on this, and I wanted to be sure we had enough time to do what we needed to do without the two machines interacting.

The shuttle leaped away from the *Spook*. Without my magnetic containment field it would have shrugged me off like a raindrop, but I stayed with it. In moments the starship wasn't even visible on the heads-up display. I shivered at the thought of all that nothingness around me; two light-years from Sol, another two to Alpha Centauri, and now I couldn't even see the metal and cobweb canister I called home. There was no way I'd be able to find my way back without a signal beacon.

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But even so, this was a crowded freeway compared to the nothingness that awaited me in an hour.

I spent the time trying not to think about it. This was going to be like doing brain surgery with a hatchet. If I hadn't thought of it myself I would have gone into hysterics at the very idea. That Tilbey and Liam had gone along with it attested to how mixed-up our consciousnesses had become.

The farther away I got from the *Spook*, the easier it became not to think. Speed-of-light lag was making communication difficult between my "body" and my "brain." My standing wave existence allowed some degree of autonomy, but not enough for complex thoughts. I felt like Hal in *2001, A Space Odyssey:* "I can feel my mind going, Dave. . . ." Even so, the acceleration stopped and the navicom said, "Maneuvers completed" long before I was ready for it. I was now officially A Long Ways Away.

The confinement cage switched off automatically. I looked at the instrument panel to make sure the radio was on. It took slow, deliberate action to move at all. "Hello, *Spook*," I said, laboring over the words. "Ready when you are."

"Synchronizing our clocks," Tilbey said nine seconds later.

"Ready," he said a few seconds after that.

I looked at my timer readout. It counted down from sixty seconds. When it got to five, Tilbey started counting down from his side, "Ten . . . nine . . . eight . . . " I panicked for a moment and would have aborted the countdown if I could have moved more quickly, but then I realized that was right. When Tilbey's light-delayed voice reached "Four," it was actually zero in both places.

Both mass eliminators switched off.

I didn't disappear. It took four seconds for my image to realize the props had been kicked out from under it. *Then* I disappeared. At least I assume I did. From my point of view, the universe did. But I was counting on one thing staying put, at least for the few seconds that it would take for the mass eliminator on the *Spook* to lose its lock on it. I was counting on the essential spark of life that was me, my soul, if you want to call it that, to hang around where I had last been using it, at least for a little while. I was half afraid there would be a bright tunnel of light to draw me away, but it hadn't happened the first time I'd been switched off, so I didn't really expect it now. I was much more worried that neither mass eliminator would pick me up again when we turned them back on.

Back on the *Spook*, the other five ghosts ceased to exist as well, the two originals first, then the three duplicates when the signal from *my* end stopped. The empty ships drifted along on their own while timers counted down another ten seconds for good measure, just to let everything settle down to its ground state. Then the mass eliminators switched on again.

I looked at the lander's controls. I could see and think again. I reached out and grasped the edge of the control panel. I could move and touch and feel again, in real-time. No speed-

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of-light lag. The essential packet of information that defined "me" had been captured and enhanced by the mass eliminator, just as it had the first time I had died. Only this time I was in a different machine.

"I'm in the local unit," I reported, and waited for a reply. It was a long nine seconds.

"We're up and running here," Tilbey reported. He sounded surprised.

"How many of you?" Wait, wait, wait, wait. Had the copying process actually created three more "souls"? I was betting it wouldn't, but if it did we had an even bigger crisis on our hands, metaphysical as well as physical.

"Just two," Tilbey said. "You can come home now."

I let out an imaginary breath I hadn't even known I was holding. "Command, take me back to the *Spook*," I said.

I smiled most of the way. Laughed aloud a time or two. Even sang an old Necrotic Nuisance song I found still rattling around in my new, expansive electronic cranium. We had succeeded in separating out one ghost from the others because of that tiny spark of identity that persisted after death, but we couldn't undo the mixing that had already happened to our holographically stored memories. Only time would erase those neural pathways as other, newer experiences overlaid them, but that was still better than what we had faced otherwise.

We had one more split to make. Tilbey had to build a third mass eliminator, and next time it would be Liam in the lander and Tilbey and me back on the *Spook*, but when we were done we would each have our own separate hardware generating that peculiar brand of software we called "us." And without all those overlapping memories and multiple retrieval efforts to cause "pointer faults," we probably wouldn't fill up our nets again for a long, long time.

After I docked with the ship, I stayed outside for a moment to look at the stars. There was no hint of motion; the ship just hung there against its velvet-and-snow backdrop. But I knew we were going somewhere. I looked ahead, along the axis of the ship, to the bright star directly ahead.

Alpha Centauri beckoned us onward, the only light at the end of the tunnel I needed. ■

Editor's Note: This story is a sequel to "Unfinished Business" (October 1996), "The Spectral Stardrive" (November 1996), "Holiday Spirits" (January 1997), and "Cease and Deceased" October 1997.

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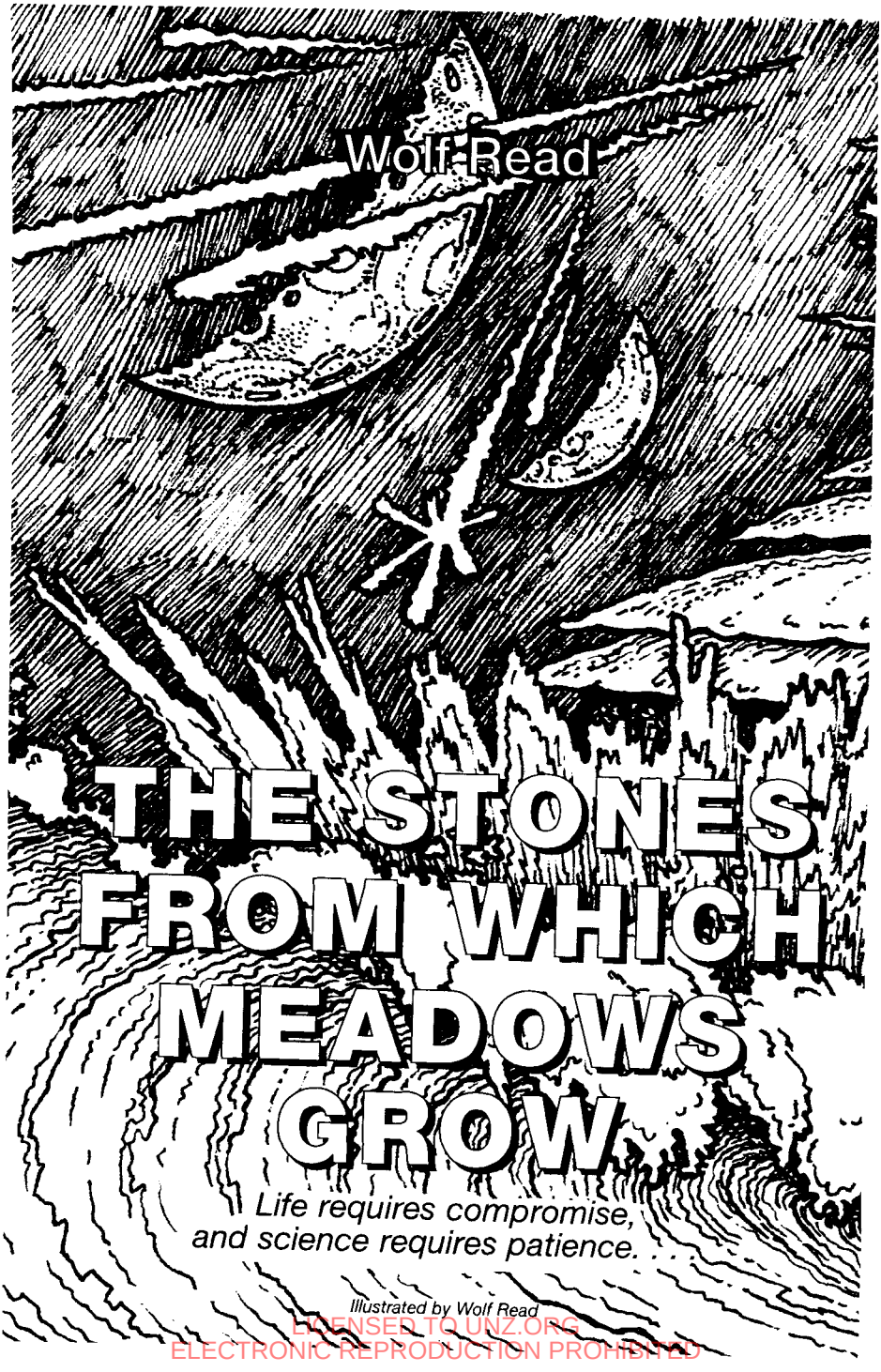
Wolf Read
THE STONES FROM WHICH MEADOWS GROW
Life requires compromise, and science requires patience.
Illustrated by Wolf Read

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Trying to stay warm in the cooling nighttime air, Amberle sank into the park bench and crossed her arms. *I should have listened to Mom and brought a jacket,* she thought.

She stared at the fuzzy glow created by the broad rings of asteroids circling Alpha Mensae. The glow's bright centerline muted remote planets, and she could just make out the tiny disk of Hercules, the largest sphere in the system.

A flickering trail flashed across her vision. She grinned as she watched the bolide drop low, toward an ocean horizon barely illuminated by billions of distant asteroids. Two lesser streaks followed, one exploding brilliantly and leaving a feathery plume of incandescent smoke.

Too high up to be a "boomer," she thought disappointedly as the smoke trail faded. And still not close to the big strike two weeks ago.

The early morning meteor had been huge, making a fire trail as wide as the larger of Goliath's two moons. Casting sharp shadows, the falling iron chunk plunged into the ocean to the northwest, igniting the western sky with a brilliant fireball. A clear boomer, the meteorite's sonic report rattled the colony arcology. Hours later, a rumbling tsunami ran over the beach and surged around Seaside's foundation, washing past second story windows, the sight leaving her breathless as she watched from the arcology's rooftop park.

Side by side, two meteors sizzled overhead, bringing her back to the present. She sighed. Ever since the "big one" the frequent lesser events seemed much less impressive.

"Ah, there's one!" she excitedly called to the empty rooftop as she glimpsed the end of a brilliant airburst, one that left a flashing impression on her retinas. "Just maybe . . ." A breeze shuffled tall trees behind her, native plants reminiscent of Earth's long extinct lycopods. She hoped the noise wouldn't drown the incoming sound as she held her breath in concentration.

A deep rumble reported from the ocean. "Nice," she replied.

Walking across the broad, flat roof of Streamcrest arcology's aviation wing, Amberle silently moved up to the line of waiting classmates. Bright sunshine warmed her back comfortably despite ocean-cooled air, and glinted from the shiny windows of several massive ducted fan craft.

Last in line. She noticed other students wearing shorts, and glanced at her long trousers. *Oh, no,* she thought, *I'll be cooking in the desert! Well, my knobby knees are nothing to look at anyway.*

"OK, class!" spoke a lanky, bearded man.

She remembered his name: John Hackett, a geologist taking time from his duties to give a field lesson on Goliath's geology.

He said, "Shall we get inside?"

Like a bird lifting its wing, the ducted fan craft's broad door opened. Shoving their way inside, kids at the front ran up the ramp to get the best chairs.

"Now slow down!" called Sarah

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Price, who typically took time off from her botany work to supervise their field trips.

The rush slowed, and Amberle patiently waited her turn to enter. She noticed that the vehicle was named *Einstein* when she reached the door. Stepping inside, she stared disappointedly at the full chairs. *Nothing is going my way!*

A gentle tug on her half-sleeve made her glance to the right.

Wes, her closest friend, grinned and said, "I saved this seat for you." With his long arms and hands, he indicated a chair that had a light jacket covering its top.

Feeling relieved, she smiled. "Thanks." Squeezing past him, she dropped quickly into the soft chair.

Sarah walked by and took an empty seat near fidgety Dave.

John stepped to the front. "Class, your attention!"

The kids quieted.

"Dave," asked John, "tell me what we discussed yesterday."

Amberle hated the question part of field lessons, and, feeling nervous, sank low in her seat.

Rubbing his unkempt brown hair, Dave replied, "That . . . that our planet gets a lot more meteors than the Earth."

John smiled. "Good! Can anyone give some exact figures?"

Amberle looked down at her big feet and hid her face behind long brown hair.

Wes nudged her, and whispered, "Amberle, you know this stuff."

She looked at him with lowered brows. "I don't want to!"

John must have heard her voice, for he asked, "Amberle?"

Sighing, she looked up and regurgitated John's lecture of yesterday, "The Earth experiences a strike greater than one-gigaton explosive yield about every ten thousand years. Here on Goliath, we get the same strike every fifty years."

"Good job. And we have many lesser impacts than this. One-hundred-megaton bursts happen about every five years. One-megaton blasts occur each day!"

Many kids looked frightened. John quickly added, "Fortunately our atmosphere protects us from the smaller bolides by making them explode high above us."

"But aren't there really big ones?" asked Elizabeth, Sarah's daughter.

John nodded. "Even though we have more small meteorites than the Earth, the frequency of teraton-range strikes isn't notably higher. Teacher, give me a mass curve for the Solar System's interplanetary debris."

An image appeared next to John, one full of asteroid silhouettes decreasing in size as they followed a rising red line.

"The number of bodies of a given size jumps radically as we move down the masses. There are about two thousand bodies of a kilometer or more in diameter that cross Earth's orbit. Bodies one hundred meters or wider have a population of 600,000. Several billion one-meter-plus meteoroids orbit within the realm of the Earth. Here at Alpha Mensae, the difference is even more extreme."

A new graphic appeared, showing

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her home system's steeper curve.

"Which means that Goliath doesn't get many more globally ctastrophic impacts than the Earth."

"Also," Sarah added enthusiastically, "if the proposal is accepted by the Colony Council, dangerous asteroids will be deflected."

Amberle, remembering the beautiful plume of the big strike offshore of Seaside two weeks ago, felt a great surge of disappointment at Sarah's words. Forgetting her shyness, she said, "Isn't that forbidden by the charter?"

Giving her a measured look, Sarah said, "Yes. That's why the plan must pass through the council."

"But that goes against our reasons for coming here!" Amberle blurted. "We can't learn about Goliath if we change things before we've had a chance to study them."

"How can we study Goliath if a large asteroid destroys our research facilities, or worse, kills us? We can make changes that are required for our presence here."

She recalled something her dad had said, and repeated it: " 'The joys, and possible benefits, of exploring Goliath are worth the risk.' "

"Some people have changed. There've been new children born, giving their parents more concern about the impacts than before. Besides, we'd only be deflecting the larger bolides."

Amberle frowned. No more big, wondrous light shows.

"It's out of our hands, Amberle." Sarah sounded a bit exasperated. "The matter has been put before the council and they will decide in a few days."

Amberle sat stiffly, feeling embarrassed by her outburst in front of the class. Her face was hot and she was certain it had assumed an unpleasant red color.

John said, "Getting back to our discussion, we all know why there's so many more meteors, right?" Looking at the many shaking heads, he said, "Did I forget to mention why?"

A multiple "yes" erupted from the students.

"Teacher, can you give me a map of the system?"

"Sure, John." The artificial intelligence projected a holographic map of Alpha Mensae's planetary system.

John pointed to numerous broad rings situated between red-marked planetary orbits. "We discussed planetary accretion, so I'm sure someone can guess the origin of these rings."

Wes replied excitedly, "Yeah. Those are what's left over from the nebula—chunks of ice, rock and iron that haven't fallen into our planets."

John nodded and said, "Alpha Mensae is only one-third the age of Sol. The Solar System doesn't have these rings because they have depleted over its many years, or they simply did not form. As a result, fewer bolides strike the Earth. The asteroid belt, of course, is an exception."

"We should get moving," interrupted Sarah.

Glancing at his wristcom, which served as a watch, John said, "We'll resume this talk upon landing." He climbed into the pilot's seat and conversed with the DFC's autopilot.

Cushioned restraints closed around Amberle. The vehicle's engines

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warmed up, whining softly. Feeling depressed, Amberle gazed out the window, studying the dense forest of lycopodium-like trees that lined the beach Seaside had been built on. *How can I change the council members' minds about the asteroid deflections?* She felt helpless.

Amberle stared at the barren countryside below, admiring the sharp ridges protruding starkly from narrow, flat valleys. A dune-filled sand beach hugged the empty foothills. Having flown for several hours, they were deep in the desert.

"Still down about the deflections?" said Wes.

She quietly stared outside.

"They won't be moving them all."

"Only the large, most exciting ones," she grumbled.

"Well, those hits are dangerous."

"Arcologies can withstand tsunamis!"

Wes said, "Maybe not a wave larger than the one two weeks ago."

She recalled the coat of sand the tsunami left on the arcology's second story windows, a beautiful sight because of its unanticipated nature. "Even on Goliath, there isn't much chance of that happening."

"It looks like some people think the chance is good."

She glared at Wes, and then looked away. "I know deflections are for good reason. But why should other people have the authority to dictate *my* world for me?" She sighed. "It's so depressing."

The engine's pitch shifted, and they descended. From her broad window, Amberle saw ridges rising like a series of expanding, dirty waves. *Muddied*, she thought, *just like my fun.*

"Great!" she heard Dave say in front of her. "We're almost there."

Amberle felt a nervous twinge in her stomach, a feeling she usually got when she neared a location unfamiliar to her. Dropping below a sterile summit with a surprisingly flat profile, the craft settled in the shallow valley, kicking up a thick plume of dust.

John stood up and, talking above the noisy students, said, "When we go outside, I want you guys to stick close to me."

The door lifted and a waft of hot wind drifted through the air conditioned interior, making Amberle feel uncomfortable. Her classmates stood and filled the aisle, pushing each other as they moved outside. Waiting for them to clear, Amberle sat still.

Wes said, "John told me earlier that this region hasn't had any rain since we colonized Goliath."

Amberle glanced at the parched countryside. Aside from a few dead weeds, their stems broken and twisted by wind and heat, nothing biological added to the expanse of gray rocks, gravel and beige soil.

"How could rain miss this area so much? It's right by the ocean."

"John said something about the tall eastern mountains causing the air to sink, and the cold ocean water killing storms, but I didn't quite understand."

"Hm."

Seeing the aisle clear, Amberle stood. Wes followed her lead and stepped into the narrow passageway. Together, they walked to the exit. Outside, Amberle felt hot under the

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bright sun, and again wished she had brought shorts. She spotted the class standing next to a cliff and walked to the rear of the group.

" . . . Your attention to these layers here." With a beaten geopick, John pointed to the rough-surfaced wall. "See how we have this sand deposit?" He hit the white line with the tip of his pick and a fine, glittering spray trickled down the cliff's face. "This line marks a time when an impact-generated tsunami arrived, dumping sand and," he pried out a bright white object, "sea critters up here." He gave the shell to Elizabeth, who looked at the item for a moment and passed it to her friend, Mara.

"We're so high up!" said Dave.

"Yes, we are," John replied, smiling, "This valley floor we're standing on is ninety meters above mean sea level."

"That's a big wave," said Wes.

John said, "Indeed it was a big wave. Happening many times, as you can tell from the repeating sand deposits in this exposure."

Looking concerned, Elizabeth asked, "Don't we get the same waves at Seaside?"

John nodded. "Yes. All the coasts have them."

Dave snidely commented to Elizabeth, "Then why was Seaside built on the shore?"

"A good question," said John, giving him a sharp look. "One you should know."

Elizabeth answered for him, "Our parents are studying the intertidal zone, and want to live close to their field work."

John smiled and nodded. "Tsunami early warning systems are in place. There's only a slight risk of being caught by surprise."

Unconcerned about the risk of a threatening wave, Amberle studied the dead plants on the hillside. Growing curious, she found the nerve to ask a question. "I read that tsunamis deposit too much salt in the soil for plants to live. How's that one grow?" With a sweaty arm, she pointed to the bleached stems.

"Oh, I hadn't seen those." Sarah walked to the dry weeds and broke a brittle stem with her hand. "Amberle is right. Up north, where rain is abundant, it carries the salts away, allowing plants to return after each wave. But down here there are no cleansing rainstorms. Maybe the plant grew in a time when more rain fell."

"Isn't that a dead plant in that layer?" asked Dave, pointing at the cliff.

John pried out the small jagged cylindrical object. He tapped the fragment and it rang like a tiny bell. "Yes, a plant stem, but fossilized." He tossed it to Sarah.

After comparing the fossil to the stem she picked, Sarah replied, "They could be the same species. Looks like there's some variability of climate here."

"Class, I'm impressed with your questions and curiosity."

Many kids, including Amberle, smiled at his compliment.

"We're through with this site. I have another down this valley a ways," he pointed to the southwest, over the flat, dusty bottomland, toward a narrow canyon bisecting the western

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ridge, "but we'll look at it later. Time to take a break."

Amberle walked up to John, wiped sweat from her brow, and abruptly said, "Is there anything that might keep us from deflecting the asteroids?"

John raised his eyebrows. "I was wondering when I'd hear more about that from you. Why?"

Amberle, feeling nervous, hesitated before answering, "Because I like watching them."

John rubbed his bearded chin in thought. "The closest thing I can think of is that the deflections at Earth and Mars have disrupted many previously stable asteroids. This has caused an increasing number to wander into the inner Solar System. Since the asteroids are being deflected, this hasn't been much of a problem—yet."

"Wouldn't that be a bigger problem here, since there are more asteroids?"

He nodded. "Good idea. They'll get very busy, but I think automated satellites can handle the greater number."

Disappointed with his answer, Amberle frowned. "What if they can't handle them all?"

"Then it'll be a problem. But, you'd have to convince the Colony Council. Not an easy task. I know—some of them have asked my advice on this topic."

Amberle was both surprised and elated by his last comment. "You don't want the deflections either?"

John shook his head. "We haven't been here two decades, and have just begun learning about Alpha Mensae's rings. If we start disrupting the asteroids before we know them, then we may be missing a good opportunity for learning."

"The council doesn't agree?"

"Hard to argue against people's fears, no matter how irrational they may be."

After finishing his latest geology lecture, John coughed and said, "I've covered it all. None too soon, for my voice is getting hoarse."

Amberle held a hand over her eyes to block invading sunshine. Evening had arrived, and under normal circumstances she would have been happy for the arrival of the cool, soothing sea breeze. Feeling that the bolide situation was hopeless, she frowned at the wind, angered by the way it tangled up her difficult hair.

"Do we get to explore now?" Dave eagerly said.

"Certainly," said Sarah. "*But*," she emphasized, looking at the whole group, "be back in thirty minutes so you can eat dinner before we head home."

Forming their usual groups, kids wandered off, talking excitedly.

Amberle watched Dave, Wes and some other boys walk toward the western hill. Wes waved at her. "Amberle, let's watch the sunset from above!"

Unable to feel Wes's excitement, she hesitated.

Wes stopped and yelled, "Please, Amberle! It'll be neat to see!"

"Oh, all right!" She followed, feeling embarrassed by her classmates' stares.

Constantly slipping and having to catch herself, Amberle found climb-

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ing difficult. Small stones dropped into her shoes, painfully shoving against her straining feet. Puffs of dirt lifted in the warm air, getting into her eyes and mouth. She tired quickly, and her breaths became rushed.

Her foot slipped, and she fell face forward. Sliding several meters down the hillside on loose soil, she scraped her arms and knees. Her foot caught something solid, stopping her plummet.

"Are you OK, Amberle?" asked Wes.

"My knees hurt." She looked at one of her knobby joints, noticing the blood-stained tear in her pants. "But it's nothing serious."

She stood, and heard her solid footing snap. Thrown off balance, she just caught herself with outstretched arms before hitting the hillside face first again.

Wes walked down and helped her to her feet.

Wondering about the object that had broken underfoot, she pulled it from the ground.

"What is it?" asked Wes.

"I think it's a root. There's some moisture in it." Squeezing hard, she forced a few tiny drops to trickle from the strange bulb. "I'm going to show it to Sarah."

"Do you want me to go with you?" asked Wes expectantly.

"Nah, I'm fine alone. Finish your climb."

"Thanks." He turned and hiked upward.

She carefully picked her way down the hill, choosing areas with large, firm rocks. Her tired legs wobbled disconcertingly as she worked her way down, but, in her urgency, she refused to pause. Finding the root had lifted her mood. And she was sure Sarah would want to see it.

Amberle trotted across the flat valley, holding her treasure firmly. Many stars glittered in the cobalt sky, and only an orange dusk glow lit her path.

Most of the students sat away from the DFC, eating and talking among small boulders they used as chairs. John and Sarah walked into the hovercraft just as she reached the vehicle's nose.

Amberle literally crashed into John as she ran through the hatch. Holding up the root, she said, "Look what I fou—"

A brilliant light seared through the craft's large windows. The unexpected illumination flashed from the front, and they ran down the aisle to see the cause.

Peering from the bridge window, Amberle glimpsed a titanic fireball dropping below the mountaintops. A large retinal impression blocked her vision as she looked at John and said excitedly, "That one's going to make it down!"

A loud thunderclap shook the DFC, throwing Amberle into Sarah. *A boomer!*

"Was that the explosion?" asked Sarah, as she held onto Amberle.

"No," said John, "just the sonic boom."

With her calm voice, Teacher said, "Transmission with emergency tag."

After intense crackling, Amberle heard, "Seaside, research craft *Road-*

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runner. Large—" An irritating whine interrupted the transmission.

"Seaside."

"Large fireball to northeast!"

"Seaside. Copy. Southern horizon brightening."

As if Alpha Mensae were rising in reverse, the entire western horizon blossomed with painful light. Growing brighter than the sun, the illumination seemed to shine from all directions. Amberle shielded her eyes from the intense flare, seeing from the edge of her vision the sky turn bright daytime blue.

"Astrolab. Satellites indicate a one-point-two gigaton yield!"

"Fireball spreading. Way too fast!"

"Punch it *Roadrunner!*"

"Raining fire—" The transmission ended in a loud series of pops.

"Damn."

"Control. Oceanlab, tsunami status?"

"No details!"

"Geolab. Strong motion seismograms firing on Ember Island! Surface impact!"

John said incredulously, "It hit *that* close?"

"Astrolab. Impact sixty klicks southwest of Ember."

"Geolab. Agree."

"Oceanlab. That's deep ocean. Tsunamis certain."

"Control. Tsunami alert!"

A high pitched whine made Amberle wince. A bright red light flashed on the dashboard.

"All personnel to coast evac stations. Level three emergency."

"I don't believe it," said Sarah, staring out the window.

Amberle watched a fiery column stretch above a rapidly ballooning fireball. Arcing high over the valley, the harshly glowing tower traced the same path that the bolide had followed on its way down.

"We've received no response to our signal," informed Teacher.

As if they were on a vessel in a turbulent sea, the floor tilted sharply. Sarah staggered across the bridge, carrying Amberle with her. Grabbing hold of the pilot's chair, she stopped their movement, just to be carried backward by a strong reverse motion. John gripped the dashboard.

The next ground wave tossed everyone down. Amberle banged her head against the chair, and Sarah landed on her. Amberle gasped. She stared out the window and saw a hillside starkly illuminated by the new "sun." "M-mov . . . moving." She shoved Sarah's shoulder, trying to get her to look up, while the jerking floor of the DFC slammed painfully into her head with each passing terrestrial undulation. "The hillside's moving!"

"The kids!" Sarah screamed.

John, trying to stand in the bucking craft, looked at Sarah, fear strong on his face. An unending array of insistent, ear-pounding crashes erupted from the rear of the DFC. Amberle yelled, but could not hear herself as the back of the craft caved in, smashed like paper by unimaginable weight. Her ears popped. The vehicle leaned sideways, screeching from its sudden abuse, throwing John into the wall.

Amberle lifted her sore head, trying to keep it from hitting the floor. Over the staccato racket from the vibrating DFC's loosened panels, bouncing

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seats and snapped beams, and just audible above the continuous rumble outside, she found that she could hear the transmission again.

"*Einstein*, go east ASAP. Geosat Seven detected a four meter tsunami. You've got—" The urgent voice faded in a static-screaming storm.

Sarah clawed the pilot's chair and stood up, bracing herself tightly against the fading temblor. "Four meters," she said hopefully. "That's not very high."

John sat up, his face ashen. "That's a four meter *deep sea* wave. When that tsunami reaches the shallow continental slope, it'll be forced much higher. Multiply the four meters by thirty-five for a rough estimate of the tsunami's peak height."

Sarah's jaw dropped.

"And it's probably an underestimate."

John glanced at the crushed passenger seats, collapsed ceiling and folded walls. He walked into the aisle, avoiding the low ceiling by crouching. Bright light continued to shine from the fireball, lancing through the remaining windows like broad lasers. He pointed at a section of missing wall. "Think you can squeeze through, Amberle?"

She nodded.

Guiding her across the contorted floor by the hand, he led her to the hole. "Watch those sides. They're sharp."

Amberle nodded and climbed down on her sore knees.

"Get everyone uphill."

Worried for John and Sarah's lives, she hesitated. "But what about—"

"I'll get us out. We've maybe forty minutes."

Sarah asked in a frightened tone, "Can we even make it in . . ."

Amberle didn't want to hear any more. Being careful not to touch the jagged hole's edge, she squeezed through and crawled over a scattering of loose boulders. As she stood, lightning flashed from the eerie blue-gray sky, making her jump. A loud crash of thunder followed, echoing between the hills. Several fireballs brilliantly whisked overhead. Feeling vulnerable standing in the open valley, she crouched.

John stuck his head out of the opening. "Go!"

Motivated by his raised voice, she stumbled away from the DFC.

She encountered Elizabeth and her friends. "You've got to . . . to climb that hill!" Panting hard, Amberle pointed to the one that she had tried climbing earlier.

"What's happening?" replied Elizabeth, nervously glancing up at the brilliant, phosphorescent sky.

"A flood's coming!"

Staring blankly at the fading fireball, Elizabeth didn't pay attention.

Amberle looked at Elizabeth's companion, Mara. "Help her up the hill."

Mara nodded. She grabbed Elizabeth's hand and led her toward the ridge. Rosalee, another friend, held Elizabeth's opposite arm.

Amberle ran into the large dinner group. Frightened kids stared at the blazing sky. Many were just standing up after having been knocked down by the earthquake.

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"Tsunami!"

Several students dashed toward the hill. Their actions had a cascade affect, motivating the entire group to run away.

Amberle followed her fleeing classmates, banking toward the DFC and seeing that John and Sarah had managed to widen the hole in the craft's side and squeeze through. Having returned from their climb, Dave and the rest of the boys walked around the half buried vehicle, watching the other kids run past. Wes wasn't with Dave.

Echoing from the hills with the sound of tumbling mountains, crashing avalanches, and cascading water, a body-pulsing noise reverberated for several long, torturous moments. Amberle covered her ears and shivered.

"Fireball concussion!" said John.

Dave turned around and ran.

"Where's Wes?" she yelled.

Dave stopped, turned, and said, "Before the strike, he hiked into that valley." He pointed toward the deep incision in the coastal mountains.

He could have been injured by falling rocks! Amberle turned and ran. "Wes!" she called, moving rapidly along the base of the ridge trying to find her friend.

"Wait, Amberle!" yelled Sarah. "We'll find him!"

She ran harder.

Turning into the V-shaped cut through the coastal ridge, she encountered a steep, barren creek bed. Carefully choosing rocks as steps, she climbed down. Despite the slowly fading fireball, the air had grown sharply cold, and her fingers hurt as she grabbed cooling stone for support.

She slid down a short cliff of hard dirt and gravel. Clawing the soil to her side, her hand punched through the ground and encountered a number of smooth rocklike objects in a small cavity. She heard several small pops as her hand crushed the stones inside. Warm liquid oozed around her digits. "Ick!"

Immediately releasing her grip, she dropped to the bottom. Her hand pulled some of the round objects out, and they wetly shattered on the gravel at her feet.

Curious about the broken spheres, she crouched and studied embryonic things resting in a dense fluid, their tiny hearts exposed and silently beating. Feeling guilty for killing the unknown creatures, she looked away. She wondered how much life the desert actually contained. *All dormant,* she thought. *Why?*

"Amberle!"

Barely visible on the edge of the high ridgeline, she saw Wes waving at her.

"The tsunami's nearing!"

From her vantage, she could just glimpse a sliver of beach through the steep walled valley, a stretch of sand much broader than she remembered. Beyond, a great, dark wall loomed. Her heart jumped as she realized just how close the gargantuan wave was, and how far *down* she had run.

Bloodying her fingers by jabbing them in sharp cracks, and scraping her elbows and knees, she rapidly gained altitude, surprised by her heretofore untested ability to climb. A steady rumbling increased from the

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west, and the ground shook. Small stones dropped onto her head. Encountering smooth rock, her ascent slowed as she desperately sought out tiny, flaking ledges and thin cracks for grip.

She glanced up, squinting her eyes against falling pebbles and dust. Wes had descended part of the ridge. He reached down. "Climb!" he yelled in a voice barely audible over the noise of crashing water. "Just a little higher, and I can help you up."

Lightning, streaming from a distant line of turbulent cloud to the west, brilliantly pulsed in a huge arc toward the eastern hills.

She saw what looked like a ledge under the intense illumination, and leaped. With three fingers, she grabbed the lip. Her fingertips began slipping. She clawed the smooth rock with her feet, giving her arm the aid it needed in lifting her body. She reached up and grabbed Wes's hand. Helped by his firm pull, she shoved her way onto the top of the ledge.

Wes dashed up the steep slope. To her right, she saw John climbing. He must have followed her. She glanced to her left, and saw the beach fading under the foot of a wave that appeared more a mountain than a thing of water. Feet slipping in the loose gravel, she desperately ran up the steep slope, seeking large rock exposures which afforded better traction.

A cold wind grabbed her, whipping her hair violently. The ground shook strongly as the beach disappeared under a turgid mass of ocean. With an ear-piercing crack, the wave slapped into the hillside, the pulse knocking her down. Surging up the narrow valley like a water cannon, the foamy white wave exploded high into the air behind her. Frigid, biting liquid engulfed her legs. Seething past her torso, the flood shoved her up the hillside, dragging her through sharp, suspended stones, lifting her high, and dunking her head into a noise of lapping water and popping bubbles. Unsure of her orientation, she blindly reached around. *Am I going to drown?*

Her hand scraped across the rough surface of stone. She wrapped her arms around the exposure and held on in the strong current. As quickly as the water had grabbed her, the wave let go. Slurping hungrily, pulling a clawing wash of numbing air over her soaked body and dragging a vast cascade of stones below her embedded feet, the powerful liquid hand dropped swiftly away.

Steady noise to her right brought her attention to the valley. A large flood had rushed through the narrow canyon and, striking the eastern hills, piled up in a vast mound. The fluid hill sagged and ushered a furious tongue of brown water northward, covering the entire valley with its turbulent carpet. The massive DFC, lifted from under its blanket of boulders by the powerful inundation, tossed about like a plastic toy, smashing into a cliff, twisting around a rocky spire, lifting halfway up the backside of the hill only to be yanked back down again, tumbling, the insistent water slapping the disintegrating vehicle's body across wet boulders, finally coming to rest spinning upside-down in the middle of a newly-formed valley lake.

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Amberle, shaking with fright, stared at the sinking hovercraft, realizing that if she hadn't been able to exit, she would have died.

Freezing, Amberle huddled between Wes and Sarah under a sturdy overhang. Lightning had forced her stranded class from the top of the hill to the hastily located rock overhang. Constantly pulsing off to her right, the bolts struck frequently enough to make a continuous thunder. The sky glowed dimly, gently illuminating a light mist of dirty water.

"Are we going to get rescued?" asked Dave, looking worried.

John, looking at his wristcom, said, "As soon as this lightning and muddy rain stop. Our GPS is still on-line."

"What about Seaside?" said Wes. "Wouldn't the waves be as big up there?"

Mom and Dad! Amberle looked at John expectantly, as did many classmates.

"The tsunamis are going to be big, but nothing like the three we have just seen." He paused, contemplating the waves. "The colony should be OK."

Amberle wasn't so sure of his assessment. She hoped her parents were safely away from home.

John glanced at their worried faces. "Even if Seaside is damaged by the tsunamis—the waves haven't hit up there yet—our friends and families have had plenty of time to evacuate inland to Ridgecrest."

Amberle felt better after hearing his words. Nevertheless, her continued shivering wasn't entirely due to cold, wet clothes.

"I suggest that we all try to get some sleep," said Sarah. "Staying up all night worrying isn't a good thing."

Unable to forget how close the wave came to consuming her, Amberle couldn't put her mind to rest.

Nudging Wes, she said in a whisper, "I'm glad you saw me in the canyon. I was worried that you were hurt, and wasn't thinking about the wave."

Wes grinned, though not very enthusiastically. "I almost reached bottom when the fireball flew overhead. The quake knocked some rocks down, but none hit me, and I climbed back up."

She nodded, remembering the landslide which had easily flattened the rear of the hovercraft.

"Thanks for looking for me, Amberle."

"I sure gave John and Sarah a scare!"

"Things turned out OK."

She nodded, still feeling guilty.

Warm puffs of air drifted into the shallow cavern, carrying a thick pall of fine, dry ash. The sky darkened to a more normal night and the temperature increased sharply. Lightning occasionally hit close enough to light up the dust shrouded sky, producing muted rumbles of thunder.

Amberle looked at John, barely able to see his face. He said quietly, "The cooling air and ejecta originally heated by the fireball are falling back down." Anticipating her next question, he said, "Fortunately we're several hundred kilometers from the impact site, giving the material plenty of time to cool."

Satisfied, Amberle leaned back and watched the flickering electricity outside. Feeling much more comfortable

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in the warm air, she drifted into a fitful sleep, one full of dreams about running from strange fireballs that exploded into halos of cold water, fleeing a drowning Seaside, and witnessing entire mountains moving on their own accord.

Brilliant light caused Amberle to wake up with a start. *Another fireball?* She looked across the valley to see a hazy orange sun lifting above the grass-covered eastern hill. *Morning!*

Feeling relieved, she glanced at her resting classmates to see if anyone had awakened. Realizing that something had changed, she looked down at the valley. Blinking her eyes at the bright, fresh green, she exclaimed, "What happened?"

Her voice woke others, including John. He looked at her. "Hm?" Noticing the overgrown basin, he reached over and gently pushed Sarah awake. "Take a look at that," he said as he rubbed the sleep and dust from his eyes.

Sarah stared downhill. A coat of fine dust billowed from her clothes as she stood. She stumbled outside, squinting in the sunlight. "I don't believe it!"

Wincing from a soreness in her legs, Amberle stood and walked out with Sarah. She felt refreshed by a green view much more soothing than the harsh landscape of yesterday. John followed, with many other kids silently trailing, staring wide-eyed at the unexpected gift.

The vegetation reached about halfway up the hill, producing a stark line of green below the brown-gray upper slope on which they stood.

Amberle ran ahead, sliding down the loose rock and into the thick grass like plants. "How wonderful!"

She squatted and ran her hands through the cool knee-high lawn, noticing many other plants growing between the stems, some with spiral flower stalks lifting above the covering blades, and others with small, flat, ground-hugging leaves.

"I count at least seven different types of plants here," commented Sarah, as she wandered through the instant park, "all unclassified, though one may be representative of the dead plant we found last evening."

Amberle remembered the root she discovered yesterday, and quickly made the connection. "That's what I was going to show you! While climbing, I found a strange root in the hillside."

Sarah looked thoughtful. "So these plants were here all along, and we didn't see them because they were dormant?"

Amberle nodded, saying, "And when the flood arrived," she pointed to the small, reed-lined ponds that remained, "it helped them grow." She traced the line of plants growing on the opposite ridge with her finger. "See how the plants are growing up to the level the wave reached?" She noticed that John had ushered the class around Sarah and her, urgently whispering for her peers to listen. She felt embarrassed by the attention and stood rigidly.

"It seems certain that the sea water induced the growth." Sarah looked at John incredulously. "Our earlier hypothesis doesn't seem to be correct considering this discovery."

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He said, "Goliath's plants seem quite capable of utilizing salt water."

Amberle felt something on her arm. She looked down and saw a dark beetle-like creature crawling toward her sleeve. "Not just plants!" she exclaimed, gaining their attention.

Sarah gave the pseudobeetle a surprised stare. "Animals?"

"And not only this one." Fearing a bite, she brushed the creature off her arm. "I also ran into some large eggs down in the canyon, buried in the hillside."

"I think," said Sarah, looking intently at the group, "that we've discovered an entire ecology that is dependent on tsunamis for survival."

John said, "Since little rain falls here, these organisms have developed a method of survival by using the next best thing." He looked at the class. "Apparently the impact-generated floods occur frequently enough to be crucial to life forms."

John glanced at Amberle. "I think we have found a good debating point for convincing the council not to deflect large asteroids. This entire ecology would be threatened. We can't deliberately destroy an ecosystem, according to the charter."

Amberle nodded absently, considering the plants at her feet. *Why aren't I more excited about this?*

Sarah frowned, as if she weren't happy about the news.

A faint humming brought everyone's attention to a small glittering dot in the northern sky.

"There's our rescue!"

Several hurrahs issued from the gathered.

Amberle stared at the incoming craft, glad to know that she'd be back with her parents soon.

"You made some nice discoveries on this trip, Amberle," said John.

Amberle smiled, feeling good about herself. "Thanks."

Together, John and Sarah walked uphill.

"Despite last night's disruption," said John, "I'd have to call this a successful field trip."

"Clearly," said Sarah, sounding a bit glum. "Can't ask for better education than putting students right in the middle of a fascinating discovery. But I wonder what this means for everyone?"

John said nothing.

As the last students walked up the hillside, Wes stepped over to her. "Looks like you're going to get your wish!"

"Yes." She frowned.

"You're not happy about the uninterrupted impacts?"

Walking toward the top of the hill, she remembered nearly being crushed by the rockslide, how close she came to drowning, and fearing for her parents' lives. *Nature's beauty*, she realized, *is sometimes difficult to live with.*

"I guess not," she answered. ■

A stuffed shirt is an elitist in drag.

—Kelvin Throop III

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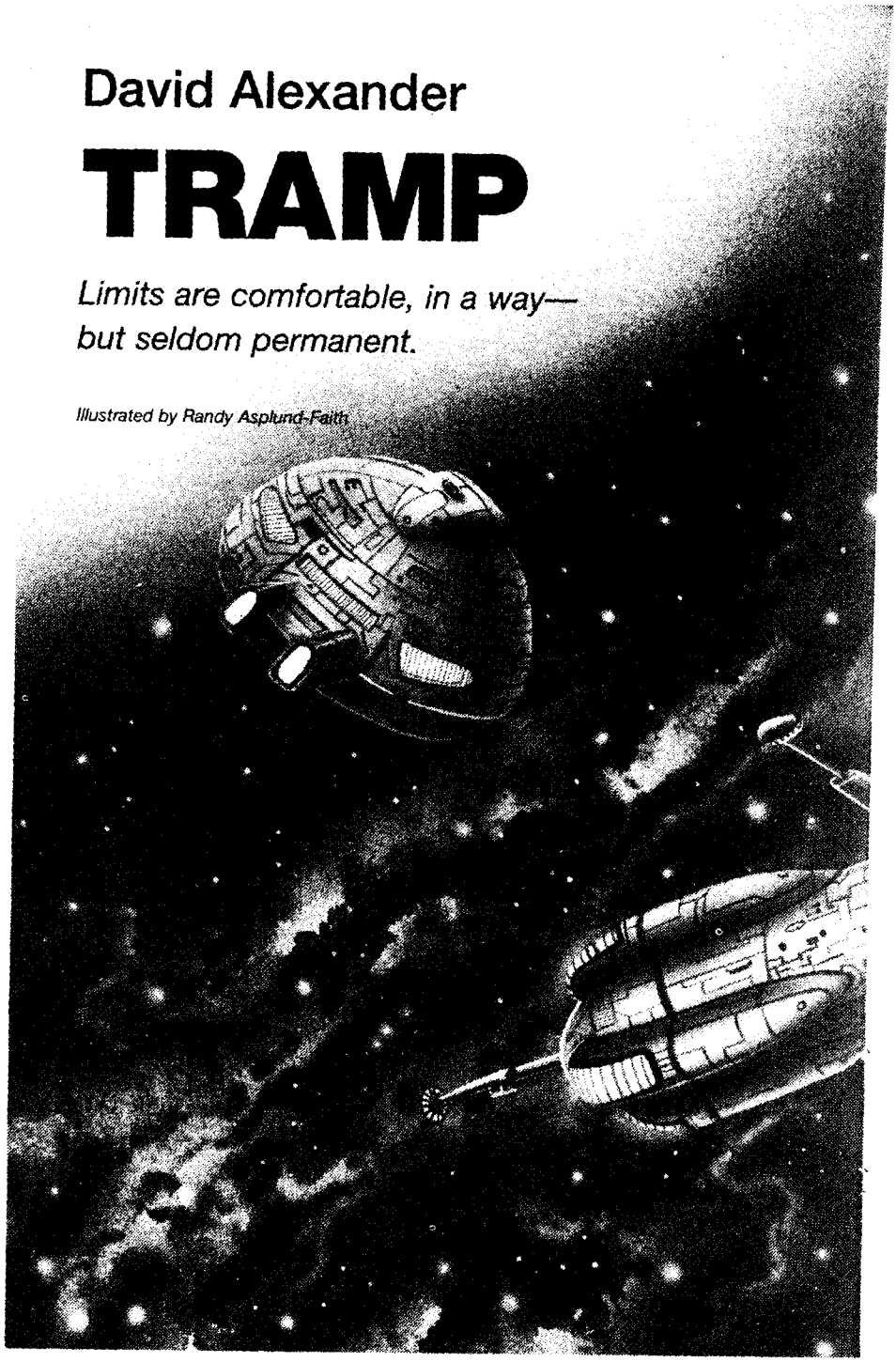
David Alexander

TRAMP

Limits are comfortable, in a way—
but seldom permanent.

Illustrated by Randy Asplund-Faith



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I could feel the off-balance tremor of the displacers through the soles of my feet as I worked my way down the cabin-way on the *Orion*'s starboard side. Every thirty-three feet I had to duck my head to clear the blow-out hatches Captain O'Bannion had been forced to install on Carlon's World before the underwriters would let us break orbit. The welder's beads where the modules were jammed against the deck plates still glinted a clean blue-black, as yet free of the verdigris that tattooed the rest of the ship.

The *Orion* was typical of the freighters plying the ports of the Middle and Outer Rings. She sported twin Murray Hi-Twist Injectors to warp the ship into Non-E where six GMF 4100 displacers maneuvered her at a cruising Equivalent Velocity of about one light-year per standard day, more or less. In the *Orion*'s case it was usually less as the synchronization of displacers two and five had degraded to 3 percent below book specs before Calipha's incantations had finally seemed to take hold.

According to the chron we should have been about 200 hours out of Coffernam, but judging by the buzz I was now detecting in the plates and the asymmetric shudder which had begun to torque the frames if you knew just where to look, I guessed that Calipha's magics were losing their potency and that our laboring displacers were again creeping to a higher level of distortion.

Today I was on the Charlie Watch, noon to eighteen hundred hours, with Adrian Mandell.

"Any traffic?" I asked Mandell as I took my place at the con.

"No, sir."

I would have been shocked had he said anything else. Nothing short of a military ship running high cycles in our immediate "vicinity" (though in Non-E there is no real physical location, which is why it's called Non-Euclidean Space) could have punched a message through to us. The first two hours of my watch were uneventful, as expected. The Prox would sound an alarm if anything came close enough to distort our bubble, the chances of which were about the same as two men three miles apart firing rifles in each other's direction and having the bullets collide in mid-flight.

The real reason for our watches was to guard against power failure, desynchronization, or the most feared, fire. Anything will burn if you get it hot enough—aluminum, even steel. This was a cargo ship, which meant it contained motors, cranes, cables, hydraulic lines, and power connections, all of which could leak, spark, and overheat. If, God help us, a fire started in the engineering decks or the crew quarters, we would have to control it fast or face death by burning, death by smoke inhalation, or death by oxygen deprivation, the operative word in each case being "death."

So, naturally, when the alarm sounded my first thought was, "Oh my God, we've got a fire!" and I immediately looked at the ship's interior schematic for the location of the blaze, but the view was clear—no smoke, no hot spots. It was only then

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that I turned back to the general data screen and studied the red letters which now filled the plate:

Desynchronization Alert

Displacement Units Two and Five are now 4 percent out of synchronization and climbing. At present rate of decline, loss of Non-E space capability is anticipated in approximately 5.3 minutes.

"Turn that damn thing off!" I shouted to Mandell as I punched up Calipha's code.

The alarm cut off, and after four rings the engineer's sing-song voice blared in my ear: "I know, I know," he shouted. "I'm doing the best I can!"

"Can you get them back into line?"

"I don't have a crystal ball, for Christ's sake! The damn things are fifty years old!"

"Look, Calipha, you've got three minutes or I'm going to have to drop us out. If we're still under power when we top 5 percent—"

"Don't you think I know that? Now let me do my job!"

"If I don't see stabilization in two minutes-thirty," I said punching up a real time display of the percentage variance, "I'm going to start powering down." My earpiece was silent for half a beat, then, in a resigned tone, Calipha said "Understood," and punched out.

"Get the captain down here," I ordered Mandell without turning my head from the slowly increasing numbers on the plate—4.21 percent, 4.23 percent, 4.25 percent. Whatever Calipha was trying, it wasn't working. A few moments later the alarm began to beep again.

"Damn it, Mandell, I told you to shut that damn thing off!"

"Don't blame me!" he growled, "Look at your board."

A new red lettered message had now appeared on the secondary monitor:

Collision Alert

An object has made contact with the exterior of the bubble. Analysis indicates metallic-ceramic composition. Object's course—

Then the message flickered once and disappeared, replaced by the plate's normal power generation figures and ship's housekeeping information.

"Did you turn that off?" I asked, turning to Mandell.

"I didn't touch it."

"Well, what the hell—"

At that instant, the warning reappeared and the alarm began again. This time it lasted barely two seconds before flickering away.

"Mandell, punch the damn Prox system up on your plate and see if you can figure out what the hell's happening," I shouted, then turned back to my main display. The levels were not only still rising, the rate of desynchronization was increasing: 4.69; 4.72; 4.76.

"I'm shutting her down," I called out and keyed the intercom. "Prepare for emergency drop-out. All hands: emergency drop-out commencing in fifteen seconds."

"Dondero, what the hell's going on?" I jerked around and saw Dennis O'Bannion swinging through the hatch. Dressed only in a hastily pulled on pair of jeans and a T-shirt, Captain

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O'Bannion's face was puffy with sleep. He had pulled the Alpha shift, midnight to six A.M., and had probably gone to bed no more than four or five hours before.

"The displacers are crashing, Captain," I called, turning back to the controls. "Calipha can't hold them. We're already 4.91 percent out of sync." As I spoke I selected the "Emergency Drop-out" command with a ten-second delay, typed in my Command Authorization Code and hit the "Accept & Activate" pad.

"Jesus!" I heard the Old Man hiss, but I was too busy to deal with him at that point. My plate changed to a green and white color scheme to indicate that my command had been accepted and the system began to echo the countdown over the ship's intercom.

"Drop-out in *ten* seconds."

"Drop-out in *nine* seconds."

The Captain hurried to the first officer's chair and activated the restraints. The day before we were finally able to break orbit from Carlon's World, our First Officer, Lin Chang, had come down with a case of measles and was barred from rejoining the ship. So now the ship's principal officers consisted of just the captain, Mandell, Calipha, Everson, the navigator, and the ship's second officer, me. I hit the button on my own chair and gallons of putty-like sludge were sucked from the tank beneath the deck and pumped into a series of bladders that expanded over my arms, legs, chest, and almost completely around my neck and head.

When the countdown reached three seconds, the data plate suddenly lit up for the third time with a collision alert, but this time the alarm did not flicker and disappear. Instead, overlaid against the computer's drone—"Drop-out in *three* seconds.—Drop-out in *two* seconds."—was the warbling *beep beep beep* of the Prox monitor, drawing our attention to the message's glowing red characters.

When the countdown reached zero the ship shuddered like a wet dog emerging from its bath. Plates, frames, and racks of equipment groaned. The bridge lights suddenly flickered out and were replaced by the glow of two of the four emergency panels, the other two having failed months or possibly years before and their death never having been noticed, or if so, the failed units never having been replaced.

In my guts I felt the twisting, tearing shudder of a return to E-space barely ahead of a collapsing bubble, the leakage of Non-E slipping past the dying fields and surging through my flesh and bone. With a final subliminal shake the *Orion* settled into normal space. An instant later our main power flickered back on.

"Calipha, report!" I ordered over my headset.

"The displacers are shut down. It'll take me a while to check them out. The engines are at nominal—no red lights."

"Mandell, check out the rest of the ship for damage or injuries—"

"I'll do it," O'Bannion broke in, anxious to get the status of his command.

"—And turn off that damn Prox alarm."

An instant later the beeping ceased and I keyed up several views generated

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by the proximity system: the first, a three-D schematic showing the relative positions of the *Orion* and the intruder; the second, a computer-generated, enlarged and enhanced view of the *Orion* and the other object; and lastly, a real-time visible-light view from the side of the *Orion* toward the point where the other object was supposed to be located. This third image showed only the black of interstellar space speckled with cold, distant stars.

Quickly, I ran through the spectrum down to IR then switched to active laser and radar. A dot about the size of a BB held at arms' length appeared, and I zoomed the display until the image filled the plate. The object wasn't a natural phenomenon, but I hadn't expected it to be. To the best of my knowledge, no one had ever detected any natural objects in Non-E Space.

The thing was sort of a half globe with a bulge in the front, rather like a lady bug with a very small head. According to the computer it was about the size of an in-system shuttle or a small courier ship, perhaps 5 percent of the volume of the *Orion*.

"Mandell, is that thing—" the Captain began but was immediately cut off.

"—I've got a distress beacon. Claims she's the *Montclair* out of Piedmont. Engine failure. Only one person on board. Requesting assistance."

"Dondero, take the boat and a couple of men. And draw a weapon from the arms' locker. I don't trust coincidences."

"Yes, sir." I slipped out of the bridge and made my way "up" toward the blister where the gig was stored just aft of the forward hold. On the way I called up two of the Cargo Master's AS's and ordered them to meet me at the hatch. I detoured just long enough to retrieve a pistol from the arms locker in the Captains' cabin. By the time I arrived at his quarters he had already transmitted the code to release the panel at my command.

I've seen some old movies where the hero has some kind of a "ray gun" that fires a multicolored beam that burns its way through the villain's chest. It's always amazed me that it could do that to a man and yet be safe to use on board a ship operating in hard vacuum. Ridiculous, of course.

The *Orion* carried four old-fashioned pistols loaded with soft plastic bullets. They were useless against any target farther than nine or ten yards away and the loads were reduced so that at only two feet the projectile would not penetrate a standard sixteenth-inch-thick instrument panel housing. But then all they really needed to do was punish human flesh, and they did that very well. I know *I* wouldn't want to go up against someone armed with one of those guns.

I grabbed a loaded HKC ten-millimeter automatic together with an extra eighteen shot clip and hurried up to meet the two men from Essabhoy's crew, Sternman and Phelps, who were already waiting for me at the hatch for the midship boat blister.

"What's up, Mr. Dondero?" Phelps, a slender man with a shaved head and lustrous, pitch-black skin asked me uneasily when he saw the bulge under my coat.

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"Nothing to worry about. We've got a small ship in distress, only one passenger. The captain just wants to play it safe is all. OK, let's get to it."

I punched in my CAC, checked that the atmosphere light was green, then popped the hatch. The boat smelled of damp iron and ammonia and a hundred other spaceship odors from overheated insulation to rancid machine oil, all concentrated in a small, cold room whose air had not circulated through the scrubbers in two months or more. The boat (it had no name any more than the rowboat tied to the stern of a schooner would have a name) had seats for eight—two people at the command panel and two rows of three seats each behind. In shape the boat was similar to the *Orion*, a cylinder with a large Plex screen at one end with the seats down the center of the pipe. When stored, the floor of the boat was close to the hull so that "up" and "down" were what we would expect them to be, meaning we climbed "down" into the boat from the "B1" corridor. Of course, in flight, the boat's occupants were weightless. Once I had settled into the command chair, I took a quick look around the cabin and confirmed that both my men had strapped themselves in. Then I turned back to the panel and keyed the intercom.

"Captain, we're ready to separate," I informed the bridge, then grabbed the joystick at the right center of the board.

"Acknowledged," came the terse reply, followed by, "In three . . . two . . . one . . . " then a shudder, and a terrific acceleration as the craft was flung from the *Orion*. Then all trace of apparent gravity disappeared. I pressed the button on the top center of the joystick, activating the control, then spun the craft until the heads-up display overlaid on the front port showed that we were heading for the *Montclair*. It took only a few minutes to reach her, and except for her salmon-colored skin accentuated by teal-blue stripes, she looked identical to the image I had seen on the *Orion*'s screens. I positioned us facing directly away from the *Montclair*'s main port and keyed the boat's radio to her frequency.

"*Montclair*, this is Second Officer Harry Dondero, of the *Orion* out of Xanadu. Do you read me?"

"*Orion*, this is Slater Eves on the *Montclair*. Yes, I read you clearly."

"Good. I'm going to mate our locks. When I give you the word, undog your main hatch."

"That's not necessary, Mr. Dondero. I've still got a little power left. I think that with a bit of luck I should be able to follow you back to your ship."

Sure, that was a good idea—let an unknown vessel with malfunctioning engines and carrying an uninspected cargo power up and head straight for the *Orion*. Not likely!

"Negative, Mr. Eves. I'll need to make a personal inspection of your vessel. Please make ready for docking."

"I don't like the idea of leaving the *Montclair* floating free out here. If you're worried about me losing control, just attach a line and tow me over to your ship."

"Sorry, Mr. Eves. Either let us on board to personally review your status, or find yourself another ride."

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"That doesn't leave me much choice, does it?" Eves said testily.

Well, too bad. At that point I had problems of my own, namely, the *Orion*'s engines were down and we were floating around out here about eight light-years from the nearest inhabited planet.

"It's up to you," I told Eves, making it clear I didn't much care if he was shy about having visitors or not.

"I'm standing by. I'll release the lock when my board tells me that you've got a good seal."

I didn't bother to reply, just locked the rear camera on the *Montclair*'s hatch and selected the "Approach & Dock" menu choice. The boat's computer plotted the most efficient course, moved the rear of the boat close to the lock, then deployed a flexible, reinforced tube with variable-viscosity gum around the leading edge. The computer positioned the open end of the tube around the hatch like the mouth of a gigantic eel, then applied an electric current through the gel at the end of the tube until the material had softened and made an airtight seal with the *Montclair*'s hull. By conduction through the plates I could hear the growing hiss of air filling the tube. Self-consciously, I patted the HKC under my coat, then released my straps.

"Phelps, you're with me. Sternman, you stay here. If everything's OK, I'll tell you that 'We're coming over.' If I say anything else, retract the tube and return to the ship. You got it?"

"Sure, but—"

"Repeat it."

"We're coming over. But, Mr. Dondero, what if you're already in the tube?"

"Then don't let us in. Look," I said trying to contain my frustration with the whole peculiar situation, "I'm just being cautious. There's probably nothing to worry about. Just do your job and we'll all be fine. Phelps, you ready?"

"Uhh, yes sir," Phelps said nervously as he sneaked another peek at the HKC's bulge under my coat.

I led Phelps to the rear of the boat, opened the hatch, and pulled myself into the tube. Knotted lines ran down each side at shoulder height and we quickly traversed the tube's fifteen-foot length. As we neared the *Montclair*'s hull, a rectangular pattern appeared as the hatch was first pulled in, then swung out of the way to our right. The yacht's lock was tiny but Phelps and I both managed to squeeze in. In a few seconds the outer hatch cycled closed and the inner one opened.

The *Montclair* was barely more than one large room serving as command cabin, lounge, and galley. Two small sleeping cabins and a head made up the balance of the accommodations, with the deck below dedicated to engines, fuel, provisions, and supplies. Slater Eves was waiting for us in the center of the room with a relieved but not necessarily friendly expression on his flat, pale face.

"Mr. Eves, I'm Harry Dondero. This is Mr. Phelps." Without the Velcro slippers Eves was wearing, Phelps and I would have floated helplessly around the cabin, so we kept our

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hands on the rubberized grips built into the wall near the hatch. Eves was slender with bone-white skin and a ruff of red-orange hair which, in this weightless environment, stood straight up perhaps an inch and a half above the crown of his head. Instead of the common disposable ship's jumpsuit, Eves wore a fanciful outfit of tight red pants and an almost fluorescent lemon-yellow shirt whose full sleeves and a collar, with points at least three inches long, made him seem like a displaced showman or a clown who had removed his make-up but not his costume.

"I'm very glad to meet you, Mr. Dondero," Eves said in a melodious, tenor voice. "Thank you for answering my call. I don't know what I would have done if you hadn't come along." *You would have starved to death,* I thought to myself, but merely nodded to Eves, his unpleasant alternative being all too obvious.

"You said you were alone here?"

"Yes. Yes indeed. Just me." Now why, I wondered, did Eves find it necessary to answer that question three times?

"Do you have an extra pair of those?" I asked, nodding at his feet.

"What?"

"Ship's slippers. Phelps and I will need to borrow a pair."

"What? Oh, slippers. Yes, of course. Let me see. . . ."

Eves rummaged through several drawers and cabinets while Phelps and I watched him with growing disbelief. How could a man traveling alone on his own ship not know where everything was? He should have been able to find the damn things with his eyes closed, but it took him almost two minutes with his eyes wide open before Slater Eves finally turned them up.

"Here you go," he said with a forced smile as he scratched his way across the rug and handed me two pairs of black elastic slippers with Velcro bands across the soles. I gave one pair to Phelps and we slipped them on over our shoes like old-fashioned rubbers Then Eves opened a hatch in the deck near the rear of the cabin and we descended to the engine room.

While I'm not an engineer, I've had the basic courses at the Academy plus over nine years in-service and I'd never seen engines like those. Oh, the basic power plant was standard enough, a GE Hercules 1900, but I didn't recognize much of anything else. Luckily, I didn't need to in order to figure out what had gone wrong. Eves had exhausted his main fuel bank and was well down into his reserves. Beyond that I couldn't see anything else wrong, though his displacers could have been as bad as or worse than those on the *Orion,* and without a full systems check I wouldn't have noticed a thing.

"OK, let's take a look at your hold," I told Eves when I was done with the engine room.

"Why?" he asked sharply. His face seemed to grow even more pale, if that was possible.

"We can't allow any craft to approach our hull without knowing what it's carrying."

Instead of replying, Eves just stared at me as if I had suddenly begun

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speaking in a language beyond his understanding. "Mr. Eves?" I finally prompted him. Eves's eyes locked on mine for a heartbeat longer, then he gave a slight shrug and nodded toward a hatch mounted in the middle of the engine room's forward bulkhead.

"You'll need to enter your code," I said after a quick glance at the panel.

"Of course." Eves's voice was tight with an edge of barely suppressed irritation. He approached the panel stiffly, as if someone had shoved a steel pipe up his spine. I watched him type in his code, then open the panel. A bonging tone filled the ship when the hatch slid aside, and Eves had to enter five more digits to cut it off. Once inside, I wondered what all the fuss was about—the hold was essentially empty. All it contained were two small cartons of emergency rations, perhaps a week's worth for one person, a small crate holding an assortment of gaskets and some sealant and emergency patches, and a cupboard stocked with towels and galley supplies. I didn't even see the usual reserve drums of water or cylinders of compressed oxygen.

"Satisfied?" Eves asked scornfully as soon as I had completed my circuit of the room.

"Perfectly." I motioned to Phelps and we all left the hold. I noticed that Eves didn't bother to double-lock the hatch behind us. Stranger and stranger. As soon as we returned to the main cabin I nodded toward Eves's sleeping room. "Better put together a bag of whatever you want to take with you."

"What about my ship? You're not going to just leave it here, are you?"

"Right now our engineer has his hands full readjusting our displacers so that we can get on with our voyage. When he's done I expect Captain O'Bannion will ask him to take a look at your engines. If there's nothing major wrong, he can probably fix them and you can be on your way. If not . . ." I let the sentence hang but Eves was having none of it.

"If not, what?"

"Our holds are full. We can give you a ride to Coffernam, that's our next port of call. You'll have to hire a ship and come back to get the *Montclair*. We'll note the coordinates for you."

"Just leave it here? Out in the middle of nowhere?"

"Who's going to take her?"

"This is crazy. Can't we secure it to your hull?"

Well, firstly, anyone with any sense knew that a ship's bubble is carefully calculated for the craft's mass distribution and shape. If we tried to weld the *Montclair* to our hull, God knows if our displacers would ever come close to synchronization again. Secondly, you never refer to your own ship as "it"—always "her." If I were a military officer, at that point I'd have demanded to see Eves's papers and his ID, but I was only the Second Officer on a tramp freighter so I did nothing.

"From what I know, that's not practical," I told him noncommittally, "but you can talk it over with the captain. We'd better get back." Eves's mouth opened, then closed soundlessly.

"All right, just a moment," he said finally as if he were a shopkeeper dealing with a disagreeable customer.

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Eves opened the door to his cabin, pulled a few pieces of clothing first from a drawer, then from the floor, stuffed them in a dark blue crylon bag, and joined Phelps and me near the lock. "I'm ready," he said firmly, as if he were about to march into battle.

"Fine, let me use your radio to let my crew know we're finished here." I left him near the hatch with Phelps and walked over to his panel and keyed in the boat's frequency.

"Mr. Sternman, this Dondero. We're coming over. Do you copy?"

"Uhh, yes sir. You said you're coming over?"

"Yes, we're coming over. Dondero out."

If Eves was puzzled by our radio exchange he had enough sense not to say so. In less than ten minutes we were all back on the *Orion*. Over Eves's objections I told Phelps to take him to my old cabin. This trip I was bunking in the first officer's quarters.

"But I must talk with the captain about my ship!"

"Sorry, Mr. Eves, but the captain's got other problems to deal with right now. When he has a chance, he'll talk to you. If you get hungry, the next meal's at eighteen hundred hours. Any of the men can help you find the crew's mess but I suggest you stay in your cabin so the captain will know where to find you when he's ready to discuss your situation." I left Eves standing there, angry and frustrated, but keeping him happy wasn't my problem. I headed back to the bridge to make my report.

"How's our new passenger?" the Old Man asked.

"I put him in my old cabin until you have the time to talk to him."

"And?" I had long ago learned not to play poker with the captain.

"And, if that's really his ship, then I'm the Archon of Deniria."

"You're telling me he hijacked it?"

"I don't know how he got it, but I don't think he walked into the broker's office and bought it."

"Is there any reason why that's our problem?"

"Not as far as I know."

"OK, I'll take care of him later then."

"What's Calipha found out?"

"A couple of fried lines, popped breakers, mostly minor stuff. The engines seem to have come through it OK."

"Can he get the displacers back in sync?"

"He doesn't even know what put them out of sync."

"Wait a minute! Twenty hours out of Carlon he told me the concentrators were overheating and screwing up the PLL. Now he says he doesn't know?"

Halfway through my tirade O'Bannion scowled and gave his head a brief shake.

"The concentrators are still overheating and the PLL is losing sync, but he claims that's not responsible for more than a 2 percent to 3 percent variance. He claims he can't find anything that should have pulled them off baseline by four percent or more."

"Then how does he explain the fact that they were off by 4.97 percent and rising when I dropped us out of Non-E?"

"He can't."

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"That's comforting."

"I'll have him check everything again, then try to rig up extra cooling for the concentrator housing."

"Then what?"

"Then we'll power up the injectors and try again. Do you have a better idea? I swallowed as if I had just tasted something bitter, and shook my head.

"OK, tell the crew we'll stay here one standard day to give Calipha time to check everything out, then we'll be back under way. We may as well take advantage of the delay. I want you to put together a list of all the repairs and maintenance items that we haven't had the time to take care of, prioritize it, and assign teams to complete as many of them as we can so long as you don't divert any resources that Calipha needs to get the displacers back into working condition."

"What do you want to do about the *Montclair*? As far as I can tell, Eves just plain ran out of fuel." O'Bannion frowned and shook his head in disbelief.

"When he's done with our engines and after he's gotten a meal and some sleep, have Calipha take a look at Eves's ship. If all she needs is fuel, calculate the minimum amount required to get her to the nearest port and I'll authorize the transfer if Eves can pay port prices."

"And if he can't?"

"Then we'll give him a ride to Coffernam and how he gets the *Montclair* home is his problem."

"He's not going to be happy about that."

"Eves's happiness is not our problem. You'd better get started on that list."

* * *

Don't be fooled by the theoreticians who will tell you that the most efficient shape for an interstellar cargo vessel is a globe. It's always twice as expensive and three times more inconvenient to build and crew a ship where nothing is square. If the *Orion* had been intended to dive into a gravity well she might have been designed aerodynamically like an old time rocket or a flying wing, but the fact was that if the *Orion* ever encountered any substantial atmosphere it would certainly be an accident. Consequently she was built like a sewer pipe—a big tube with the bridge shielded amidships just forward of the crew's mess.

Except for sensors and maneuvering engines, the front third of the ship was one big cargo hold. Aft of the bridge was crew quarters, then came the rear cargo hold, then the engines which fed energy to the displacers set at the bow and stern and the four compass points around the equator.

The early ship designs called for eight displacers, one at each of what would be the corners if the ship were a rectangular solid, but then they figured out that the inefficiencies of the fore-aft-cross arrangement were more than canceled out by the cost and maintenance savings of using six instead of eight units. After taking into account supplies, bracing, lifepods, crew quarters, and all the rest of the stuff that goes into a working starship, the *Orion*'s cargo capacity was about two-fifths of her total interior volume.

Some of the new Virgo class ships could supposedly top a 55 percent capacity versus the *Orion*'s 40 percent

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but after you amortized their higher cost, fuel, and maintenance and repair charges, the numbers didn't make much sense to anyone but TransStellor and some of the other flagship lines. Consequently, sales of the new Virgos were slow and I had heard that the Alliance Yard was already talking about massive cutbacks in their production schedule, though they called it merely "restructuring discussions."

No matter how you sliced it, if that happened, a quarter of a million people would be unemployed and shipbuilding capacity would be reduced for a decade or more. You don't just decide to start manufacturing starships today and have them roll off the lines tomorrow. All of which meant that, relatively speaking, the *Orion*'s value had risen just enough to keep her costs of repair barely less than the cost of replacement. If Alliance went through with their planned cutbacks, barring death, destruction, or tax seizure, the *Orion* would be bustling her way around the Outer Ring for another decade or more.

On the other hand, if Alliance decided to bite the bullet and stimulate Virgo sales with a substantial price reduction, it would be more profitable to sell the *Orion* for scrap and use the money as a down payment on one of the newer Elliptic class ships that would be a drug on the market if the Virgos started selling at a discount.

Well, why should I care? I had my ticket and would no doubt get another berth if the owners decided to send the *Orion* to the breakers. Still, it bothered me somehow. I had seen an old flat pic at the Merchant Academy; I don't know where it came from or even if it was true or just some writer's imagination, but it upset me in ways I found hard to explain. It was only a few minutes long and had no plot. It just showed a great steel ocean-going ship grounded on a sand beach somewhere in Africa back on Earth. Hundreds of squat black men like an army of insects crawled over her from stem to stern and, armed with torches and pry-bars, wrenches, cables, and saws, they dismembered her right down to the waterline the way a swarm of ants might slice up and carry off a rotting pineapple.

Putting thoughts of broken ships and unemployed men from my mind I continued on down to the mess. Artificial gravity is a wonderful thing, I think, but unfortunately it's impractical for anything smaller than carriers and heavy ships of the line. The military isn't constrained with cost considerations—who cares how much power the damn things suck up if not having to carry spin means the difference between winning a battle and losing it?

Since we couldn't afford the luxury of AG, the *Orion* maintained a spin sufficient to impart an apparent eight-tenths of a standard gravity at the ship's hull, decreasing, of course, as one moved closer to the core. I didn't care so long as the apparent gravity in the galley was sufficient to keep the food on my plate.

I grabbed a hurried dinner on the run and didn't see Eves again until twenty-four hundred hours, when I wandered into the mess for a glass of

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tea before turning in. I had just left Calipha in the engine room where he swore that the coolant lines he'd jury-rigged around the converter housing should be enough to let us make three-quarters EV with a desynchronization of less than 2 percent. I took another swallow, not thinking of much beyond finishing my tea and falling into my bunk, then looked up to see Eves standing in front of me.

"Mind if I join you?"

"Have a seat. You get settled in OK?"

"When will the captain be able to talk to me?" he asked in a rush, ignoring my question.

"He's going to be pretty busy until at least twelve hundred hours tomorrow, but he's authorized me to have our engineer take at look at your ship." Instead of an expression of relief, a few words of thanks, Eves frowned, then turned his gaze down to the deck.

"The *Montclair* is a very advanced design," he said deliberately a moment later, struggling to control his frustration. "I'd prefer that no one fool around with its engines."

"Moahmar Calipha doesn't *fool around* with any ship's engines. But if you want to leave the *Montclair* here instead of flying her back home, that's up to you."

"No offense meant, Mr. Dondero. I'm sure your Mr. Calipha is a qualified mechanic, but I'm somewhat protective when it comes to the *Montclair*. Couldn't you just put it in your hold and take us with you to your next port of call—Coffernam, I think you said."

"And what would we do with the cargo that's already in the hold?"

"I suppose I could make good the loss," Eves suggested gracelessly.

"Would you also explain to the consignees that we decided to throw their shipments overboard in deep space because you made us a better offer? What effect do you think that would have on the *Orion*'s reputation?"

Eves glanced around the mess, at the scarred plates, the bubbles in the dull gray paint where the walls met the curve of the ceiling, at the cheap plastic chairs and dented tables, at the chipped heavy white mug at my elbow, and suppressed a smile. "Surely the *Orion* could live with a little bad publicity, if the price was right," he said easily. It was all I could do to keep from slapping his smarmy face. I took a slow swallow of lukewarm tea and turned back to Eves.

"The only way your ship will leave this pile of vacuum is if you fly her out of here yourself. As far as I can tell, her only problem is that you just plain ran out of fuel, but I'm not an engineer. I know I wouldn't go charging off into Non-E assuming that's all that was wrong. Quite frankly, it was a miracle that both our ships happened to drop out near each other this time. You can't expect to be so lucky again."

"Luck had—Look, Mr. Dondero, don't you see—"

"I see that I'm tired and that I'm going to go to bed. I'd advise you to do the same. Get hold of me or the captain at 1200 hours tomorrow and let us know what you've decided." Angrily, I stood up and roughly pushed my chair out of my way to the limit of its

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travel, then paused and turned back to Eves. "One more thing—if you expect us to supply you with any fuel you'll have to pay for it at port standard prices. We'll need hard funds, UCs or equivalent. Otherwise the whole question's moot, anyway."

I turned away from Eves's burning glare, visited the head just long enough to splash some water on my face, and then crawled into my bunk. As I was lying there, balanced on the knife edge of sleep, I began to wonder what Eves had meant there at the end—"Luck had—." Luck had nothing to do with it? He had to have meant something else. There was no way one ship could detect another in Non-E. Our drop-out so close together had to be the wildest stroke of fortune, equivalent to winning the lottery by randomly picking the right ten numbers between zero and ninety-nine all in the proper order. But people did win the lottery that way, every day, no matter how long the odds might appear to be. I rolled over, buried my head in my pillow and struggled to blot out all thoughts of Slater Eves.

At about 0500 I woke up with a start, my mind unnaturally clear. My cabin was still in deep shadow, the panels barely glowing at their lowest setting. I closed my eyes and tried to visualize myself falling back to sleep, but after a few seconds I knew it was hopeless, and I knew why. I had to take another look at Eves's ship, to try again to figure out what was really going on. I pulled on a clean 'suit, splashed some water on my face, and headed for Calipha's cabin.

"Get dressed, we've got work to do," I told his bleary-eyed form when he finally staggered to the door.

"I just got to bed—" Calipha glanced at the chron near the door "—three hours ago," he said wearily. "What's happened? Did they find more damage?"

"We've got to check out Eves's ship. Come on."

"I've got to get some sleep," he objected, his head sagging, his eyes already drooping half closed. "Captain wants to inject at 1400 hours."

"So, take a stim. Come on, I'm not kidding. Let's go."

Calipha gave me one more exhausted glance, then wandered back into his tiny cabin. After a stop at the head and then the mess for hot sweet caff, we headed for the boat. I called the bridge and told Everson, the navigator who had the A shift today, to log Calipha and me as taking a check-out run on the boat.

"Eves know you're doing this?" Calipha asked me a few minutes later, rubbing his face as the boat's tube mated to the *Montclair*'s hull.

"It's green," I said, ignoring Calipha's question and led him into the docking tube. When we reached the *Montclair*, I opened the access panel and punched in the CAC I had memorized when Eves's had keyed his hold. The hatch opened silently and I headed in, ignoring Calipha's hard stare. I led him below deck where he hummed and muttered and clicked his tongue in surprise at the machinery he found there.

"Well?"

"Well what? I don't know what half this stuff is, leastwise if it's broken or

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not. Do you have the code for the on-line systems?"

Proper ship's security called for different CACs for ports, holds, and computer access, but as I had already confirmed, Eves wasn't a careful man. A careful man would not have run out of fuel in the vast emptiness between the stars. His codes for the main hatch and the main hold shouldn't have been the same, but they were. I hoped that the same one would access the engineering computer as well. It did.

Calipha called up a schematic of the engine room, then highlighted each major piece of equipment that he didn't recognize and hit the plate's "More Info" choice. Slowly at first, then faster as he began to find his way around the system, Calipha dove through the contents of the on-line manuals. At first his explorations were punctuated with guttural noises, "hmmms," and an occasional soft whistle, then, the deeper he got into the system, the quieter he became. Finally, Calipha closed the help window, turned to me, and let out a long sigh.

"I don't know if she's in working order or not, but I can tell you one thing: this ship doesn't belong to Slater Eves."

"Who does she belong to?"

"I don't know. And maybe I don't want to know. She's experimental, a prototype; I can tell you that. No way some clown in red pants would be flying around in this baby on a joyride where he accidentally runs out of juice."

"Experimental how?"

Calipha took a long breath, then waved loosely toward the plate. "It's all in there. She's got a new sensor suite, Prox-2 according to the manual. The on-line docs say that it can detect other bubbles in Non-E and plot a vector to them. It's still pretty crude, not very good at calculating an intercept, but apparently it works."

"So that's why I kept getting a prox alarm just before we dropped out. When he started to run out of fuel, Eves found the *Orion* on that thing."

"That's not all."

"What else?"

"Within certain energy ranges it can drop a target ship out of Non-E by destabilizing her bubble."

"What! Do you know what this means?" I said angrily as I studied the strange equipment with a look of revulsion.

"I'm not stupid!"

"Who do you think built this? The Fed military? The Combination?"

"This is no government ship. My guess? Some company was researching something or other and one of their scientists ran into whatever phenomena this Prox-2 sensor uses. They start pouring money into it, maybe figuring on a government contract. Or maybe their plan was to go straight to the Combination. The hijacking business would probably repay the investment in the first six months."

"We'll be sitting ducks for these guys! Stolen cargos, ransacked ships, kidnapped passengers—it'll be like it was in the old days of sailing ships. It'll take the Feds years to outfit a fleet big enough to protect us."

"How do you suppose Eves got her?" Calipha asked, no longer concerned about his lost sleep.

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"If you're right, maybe he was an executive with the company. He's no scientist, that's for sure. Or maybe it was his family's business. He's such a jerk, that makes more sense to me. A guy like that, he needs money, starts thinking about what he could do with a ship like this. He lets himself into the facility with a backdoor code he's been saving and takes off ten minutes in front of the cops."

"What are we going to do about this, Dondero?"

"What can we do? We don't have any proof that it's a stolen ship or that Eves or anyone else has done anything illegal, even if we were policemen, which we're not."

"But if they get this ship back—"

"Maybe they don't need it back. It stands to reason they'd have copies of all the documentation, all the research."

"If he didn't take that too," Calipha said, a crafty look creeping into his face. "If it were me, I'd have wiped out their records when I grabbed the ship. God knows the Combination wouldn't pay twice. I would have fixed it so that I wouldn't have to worry about any competition."

"That's easier said than done. We can sit here and spout 'maybes' all day but it won't change anything. Close it down. It's the captain's decision, not ours."

"Look, Dondero, I've seen broken ships, bodies floating in space. I'm not going to—"

"That's Mister Dondero. Now shut it down and get back to the boat!"

Calipha's red-rimmed eyes glared at me for a long heartbeat, then angrily he slapped the system off and climbed the stairs to the main deck. I stayed behind for another minute or two, then followed.

"What were you doing down there?" Calipha asked me when I joined him in the boat.

"Just double-checking that all the systems were off and that everything was back the way we found it. Making sure everything was shipshape."

Calipha gave me a suspicious, sidelong glance, but I ignored him and a moment later we were pulling away from the *Montclair*.

"Go back to bed," I ordered Calipha a few minutes later when we had returned to the *Orion*. "Get yourself a few hours sleep before you have to go back on duty."

"But what about—"

"I'll talk to the captain. Go on, get some rest. You've earned it."

Calipha stared at me for a moment longer, started to say something, then thought better of it and turned away. As for myself, I went down to the mess, got some breakfast, then went looking for Captain O'Bannion.

"So there's no proof he's done anything wrong?"

"No, sir."

"All right. Well, at least we can demand to see his papers."

"And then what?"

"Whose side are you on, Dondero?"

"Suppose we're right and he can't prove she's his ship? We leave her here and take him to Coffernam. Then the people who built her come back and get her and what good have we done?"

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"All right, Dondero. What do you want me to do?"

"We're not the police, Captain. We should mind our own business. What else can we do?"

Frustrated, O'Bannion turned back to the maintenance report I had just given him.

"You'll have this finished by fourteen hundred hours?"

"If I get back to work right now." The captain nodded, punched the "confirm" button on my CB, and handed it back to me.

"Get back here by the time Calipha's ready to begin injection."

"Yes, sir."

As I was leaving the mess just after lunch Eves caught up with me.

"I need to talk with your captain," he said with an edge to his voice as if daring me to argue with him.

"Fine," I agreed, checking the chron. "He should be on the bridge right now. Follow me."

I made Eves wait outside while I checked with Captain O'Bannion, then a minute later I ushered him inside.

"Captain," Eves said warily.

"Mr. Eves. Will you be accepting our hospitality as far as Coffernam?"

"Thank you, but no. If I can impose on you for enough fuel to get me to Jasmine, I'll take the *Montclair* there for refueling and supply."

"Mr. Dondero did explain to you that I'm responsible to the owners? You'll have to pay standard rates for the fuel."

"Two thousand UCs should cover it, I think. I have that much with me." Eves handed the captain his card with the debit already coded. O'Bannion looked at it, frowned, then inserted it into the ship's reader. Eves applied his left thumb to the pad, then wrote his code longhand beneath the privacy hood. The reader's light signaled that the codes and handwriting matched. The transfer would be completed as soon as the captain indicated his acceptance by the entry of the ship's code.

"Captain," I interrupted as O'Bannion was about to enter the *Orion*'s CAC, "I want to go on record as advising Mr. Eves against leaving in his ship."

"What?"

"Mr. Eves, your ship may well have sustained serious damage or equipment failure," I said, turning to the clown-like figure. "If your injectors fail or the displacers are too far out of alignment or if anything else goes wrong, you're going to find yourself stranded light-years away from any help. If you leave under these circumstances it could well mean your death."

"I'm not leaving my ship here."

"As I've told you, there's no way we can take both you and the *Montclair* to Coffernam."

"In that case, give me my fuel and I'll leave under my own power."

"Captain, for the *Orion*'s protection, I request that you log my warning to Mr. Eves and record his acknowledgment that he's assuming all of the risks of this ill advised action."

"Mr. Eves?" the captain said, looking at our pale, orange-haired guest.

"Fine, log whatever you like so long as I can get fueled up and on my way."

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The captain turned on the log cameras and Eves and I repeated our positions for the record. An hour later the *Montclair* briefly glittered a faint, pale blue, seemed to twist in on itself, and then was gone. Immediately thereafter the *Orion* brought up her own bubble, slipped herself into Non-E, and disappeared as well.

Calipha was as good as his word. With the additional cooling lines he had installed around the converter the displacers were now synchronized to within 2 percent of nominal so long as we held her to no more than three-quarters rated EV.

"I figure we'll make Coffernam about four standards late," I told Calipha over a cup of hot, bitter caff late the next day, "but at least we'll make it in one piece."

"I never thought otherwise. The *Orion*'s got a few years on her, but the old girl will get us where we're going." Calipha took a long look at the roiling black surface of his caff, as dark as the empty stretches between the stars, then, in a musing voice asked, "What do you think's going to happen to Eves? You think the Combination will catch up to him before he can sell the secret of that Prox-2 of his to someone else?"

"God, who knows? Maybe they already have it. Maybe it was developed under private contract for the Feds and he just ripped off the prototype. Maybe right now there are five copies of her plans in five different protected vaults."

"And maybe Eves blew up the lab and killed the technicians before he stole her and the only set of her plans is in the *Montclair*'s computer."

"Hell, anything's possible."

I knew, of course, what was really behind all of Calipha's questions. In a year or two or three, were we going to start seeing ships suddenly missing, finding discarded bodies exploded in vacuum after thieves and rapists and thugs from a hundred worlds had picked the broken ships clean and disappeared invisibly back into Non-E? If Eves and the *Montclair* made it to any industrialized world, I figured that nightmare was as certain as death. If he didn't, well, like I said, who knows? No matter how you figured it, someone discovered this Prox-2 once, and sure as hell it would be discovered again. It was just a matter of time. But how much time, how long would we be safe? Five years? Ten? Twenty? Someday before I quit spacing, unless my ticket got canceled early, I was sure I'd see those blown-out hulls, those bodies drifting slowly around a looted ship. But not today. Not for a while yet.

"I told him not to go," I said softly, talking more to myself than to Calipha.

"What?"

"I warned him. A ship that's failed once can fail again. He was no engineer. He wouldn't know a good displacer from a sour one. Out here, anything can happen."

"What are you saying?"

"Nothing. It's just a feeling I have."

"What kind of feeling?"

"Just a hunch, like a cold puff of air on the back of my neck. Only a fool would trust a ship like the *Montclair*,

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experimental and all. I just don't think she'll make it to Jasmine. I've got this feeling that a few hours into Non-E something else is going to go wrong and dump Eves back into E-Space light-years from anywhere. And him with just those two boxes of emergency rations and no extra water tanks. I hope he finds an easier way out than starving to death."

I glanced up from my cup and saw Calipha looking at me as if his eyes could pluck information directly from my mind if only he stared at me hard enough.

"Dondero, when I left you down there in the *Montclair*'s engine room, did you . . . ? You didn't . . . ?"

Calipha's voice trailed off as I continued to stare at a spot on the wall just to the right of his ear. "Uh . . . never mind. . . ." Calipha said finally, turning away. Then he looked back and spoke again a moment later in a more philosophical tone: "I guess a man shouldn't get into this business unless he knows what he's doing. There are just too many ways to end up dead out here if you happen to get the wrong ship."

I didn't say anything. For an instant I had a vision of the *Montclair*, dead and lifeless, floating out there somewhere in the black, empty space between the stars. Then I blinked, and it was gone.■

Science Fiction Writing Workshop
Now Accepting Applications

Applications are being accepted for the **1998 Clarion West Writers Workshop** in Seattle. This six-week workshop prepares writers for careers in science fiction and fantasy.

It will run from June 21 to July 31, 1998. Instructors include Paul Park, George R. R. Martin, Connie Willis, Lucy Sussex, Gardener Dozois, and Carol Emshwiller.

Applications should be postmarked on or before April 1, 1998. A complete application includes:

- ✓ a cover letter discussing where you've been, what you've been doing, your writing history (if any), and why you want to attend the workshop;
- ✓ 20-30 pages of typed, double-spaced original manuscript (1-2 short stories or a novel excerpt with outline);
- ✓ a non-refundable $25 application fee payable to Clarion West; completed financial aid forms if applicable. (Limited financial aid is available.
- ✓ Forms should be requested in advance by writing Clarion West.)

Completed applications should be sent to **Clarion West, 340 Fifteenth Avenue East, Suite 350, Seattle, WA 98112.** Participants can expect to pay tuition of $1,300, minus $100 if their application is postmarked before March 1, 1998. Dorm housing and college credit are available at additional cost.

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Probability Zero

Peculiar Plants

Mia Molvray

No dean enjoys dealing with irate parents, but after talking to Mrs. Isleworth, Dr. Rosen felt he'd been punctured and that his deflated remains were taking up valuable space she required for other purposes. He had been unable to explain how her twenty-one-year-old daughter had disappeared without a trace. He had been unable to convince her that summer vacation might have something to do with it. He had been unable to promise that her daughter would not be late for yet another "vital family event"—a wedding as it turned out. And when she'd demanded he find her—he had been unable to do that.

The university had its own troubles too. Professor Dibley was nowhere to be found. Nobody would have noticed until September, but the whole Isleworth event had brought it embarrassingly forward.

"Mrs. Isleworth," he had vainly protested, "I'm really not sure there's cause for concern. There were no signs of struggle and apparently Laura withdrew a hundred dollars the day before to buy camping equipment." The same was true of Professor Dibley. The dean found himself hoping that they had truly disappeared, and that especially the media would never find them.

The university had called in the police. They'd called in the FBI. What more could anyone do? He was becoming increasingly certain that Isleworth junior had absconded to escape Isleworth senior, and he wondered if there was any room for deans where Laura was.

He stood up to check on the investigation in Dibley's office, largely to flee from his phone.

Professor Dibley's office was a real old-fashioned inner sanctum. Nobody had ever been allowed in and the FBI had had to break down the door. But once inside, it was just an ordinary academic's office. Books, reprints, handouts, manuscripts, CDs, and rocks covered every surface, including most of the floor, to a depth of one to three feet. There were plants on all the window sills and some of the shelves, but of course they weren't normal plants. Dibley was a paleobotanist, and her plants were stringy, or filmy, or slimy, but not normal. "Relatives of extinct genera!" she'd told the dean once, as if it was

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some kind of triumph. It was the same with the rocks. They were not just rocks, they were fossils.

Students were peering in too, careful to leave the dean a respectful island of personal space.

"Man, what a shame," one of them was saying. "Nobody's gonna be able to do field trips like Dibley."

The dean had heard of those legendary field trips. For some reason she only did them in her well-subscribed freshman classes, but perhaps she considered them too frivolous for upper level students.

"Umm," he murmured noncommittally, his mind on serious matters.

"Yeah," another student piped up. "She really knew the area, really knew all the good spots. You'd hike for hours, turn a corner, and wham, there you were, in a different world. Laura'd been assisting her for years and she mighta known, but I hear she's gone, too."

Good god, was nobody going to wait to make the connection? The dean dove, decorously he hoped, into the office. He'd talk to the two FBI agents. Then he could ask the questions and demand answers.

However, like him, they had no answers. "I'm sorry, Dr. Rosen." The senior agent shook his head. "We've disturbed most of the dust in this office and there is no sign of any criminal activity. Since they're both adults . . ." the FBI man trailed off.

You tell Mrs. Isleworth, the dean wanted to say, but you didn't become dean by saying things like that. "Well," he said instead, "at least I can get someone to take care of her plants. Ken will probably do it." He pulled out his personal phone.

A few minutes later a typically scruffy grad student showed up. "I brought a trolley since you said there were quite a few," he said amiably, but then his gaze froze on a stringy plant like knobbly green pipe cleaners near the window. "Never been in here," he muttered, pulling a hand lens out of his pocket and peering at the plant like a Swiss watchmaker.

"Oh my god," he breathed, *"Rhynia!"* Feverishly, he stared at another specimen through his hand lens. *"Cooksonia!* And this! My God! Look at this! It's got to be Ediacaran!!!"

"Yes, well, I'm glad they're unusual," said the dean with a touch of impatience. Scientists, he thought to himself, they're all crazy. "But perhaps you could proceed, and allow these gentlemen to get on with their work."

The graduate student stared at him as if he were a hallucination. "No, no," he said, "you don't understand. This is *Rhynia!"*

"If they're that rare," said the senior agent, his eyes narrowing, "they're probably protected under the endangered species laws. Where'd she get them?"

"Rhynia? Along the south coast of England about four hundred million years ago in the Silurian," said the grad student. "The Ediacaran one, about seven hundred million years ago in the pre-Cambrian."

The dean's face was a careful mask. What was he going to say to Mrs. Isleworth? Under the circumstances, it might be in poor taste to tell her that for once her daughter was early. ■

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THE ALTERNATE VIEW Jeffery D. Kooistra

PATHFINDERS

I have always found the issue of manned versus unmanned space exploration to be sort of silly. On Earth or in the sky, it makes perfect sense to send in a camera first to look around before committing a man or woman to such a task, or to send only a machine when a human cannot go. But claiming that this can in any way be as good or better than sending a person should be self-evidently stupid. Nevertheless, since Stan needed another fill-in column, and I've always wanted to sound off, at least once, on this topic, here goes.

Let's talk about the recent *Pathfinder* mission to Mars (just last month as I write this in August of '97, just last year for you *Analog* readers). Like so many, I sat glued to the TV set as the data came in about how *Pathfinder* was doing as she made her descent to the planet. I got a kick out of the animation of a couple hundred-million dollar probe bouncing around inside a cluster of balloons. I was thrilled when signals arrived almost immediately from the craft that she was down, safe and sound, and ready to go.

A marvelous technological achievement.

I greatly enjoyed seeing the first new photos in 20 years from the surface of our sister world, and felt the stirrings of vicarious pride when the *Sojourner* rover finally rolled off its platform and onto the red sands of Mars. I reveled with the engineering and management team as they lived it up during their fifteen minutes of fame. Their enthusiasm and obvious sheer love for their jobs was the best kind of advertisement to get young people to seek a technically challenging and rewarding profession.

As the next week went by I continued to pay attention, looked at the new pictures, smiled at the cartoon names attached to every rock. Still, to fill time, the news networks put on the usual cast of talking heads—people with various opinions about this and that—and the subject of sending humans to Mars came up. Specifically, the false notion of some kind of "Man versus Machine" battle over planetary exploration.

I don't mind sending robotic probes throughout the Solar System. When it's the only game in town, then that's the game you play. Robotic exploration has its place and role to fill, and it's a big and important role. But inevitably, some character shows up

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in these interviews who actually wants to try to make the case that sending robots is all we ever need to do; that sending people would be a waste of money; that robots can meet all the science requirements we'll ever need to meet, and do it a whole heck of a lot cheaper.

Rubbish! Balderdash! Horse-puckey!

Granted, the political environment hasn't been ripe for putting on any 100 billion dollar "Man to Mars" missions in thirty years. (Actually, the 100 billion dollar figure is way high, in my opinion, for how much it *must* cost to send people to Mars. It's easy to *make* it cost that much—business as usual will suffice.) And it *has* been possible to put the money together for relatively low-cost, limited-objective robotic missions.

But does anybody really think that a Mars rover, technical marvel that it may be, that can only visit five rocks per week, that got stuck for two days with a wheel up too high on a rock, that had to delay its maiden excursion onto the surface because a deflated balloon was in the way, is anything other than settling (*really* settling) for second best?

Let's just look at this cost issue another way.

Pathfinder is one of those new NASA "faster, cheaper, smarter" missions (as opposed to "disaster, disaster, disaster" as some wags say), designed to cost in the 200 to 300 million dollar range, meet fewer objectives per mission, but with the lower cost, allow for more missions and as an added bonus, keep us from putting all our exploration eggs in one billion dollar basket. But this relatively low dollar figure doesn't include all the money that went into developing all of the technology that ultimately winds up in the probes. And the cost of the launch is not the same as the cost of developing the launch capability.

But when we look at sending humans to Mars, the estimated price of getting them there includes putting together the necessary infrastructure, since we don't have that right now. Ironically, we once did. The same Saturn boosters that put us on the Moon would have served well as heavy boosters to put Mars mission hardware into orbit. The bulk of that hundred billion dollar figure we have actually spent already. But like a careless lottery winner, we squandered our winnings. Now we have to spend it all over again. (Or something like it. Robert Zubrin has some interesting ideas on how to go to Mars cheaply, and *Analog*'s own Tom Ligon, working with Robert Bussard [of Bussard ramjet fame] has some better ideas on how to do it even more cheaply.)

Anyway, the argument is then made by some that since sending people to Mars would cost so much, and since robots are both cheaper and can do everything we want done just as well anyway, there really isn't any scientific reason to send people at all. Perhaps some arguments could be made about the human spirit and new horizons and all that. And Carl Sagan eventually came to support humans in space largely because he figured out that taxpayers wouldn't keep funding probes that were largely playthings for a minuscule number of scientists.

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But let's factor all that out. Forget about human spirit issues, sense of wonder stuff, the need for frontiers. Let's just look at the cost of doing science in general terms once we have either a robot or a human actually on the surface. We'll limit this to active work, too. The *Pathfinder* lander has scientific instruments on it and a camera, but since our human will need shelter, we can always put the same instruments on the shelter, so those costs are a wash. This leaves us with the active process, which in our recent case is the *Sojourner* rover.

In a recent humorous *Analog* story ("One Small Spin," by J. G. Hemry, Sept. '97), mission control ultimately ends up secretly sending along a man to fix the robotic missions that keep failing. Having worked in a lab where time estimates of how long a task will take are made by figuring out how long things would take if everything that can go wrong does go wrong, and then doubling it, I can identify with the idea of having a person on hand to fix problems. But for our purposes, we'll just assume everything works fine on the robot.

Day one for *Sojourner* was marked by a one day delay since there was some concern that it might get stuck going over the deflated balloon fabric projecting beyond the edge of the landing leaf. Since the rover had a design life of only ten days (I know, it lived longer, and is still alive as I write this—but you can't figure on that.), and thus mission objectives to be met in that time frame, it lost one-tenth of its allotted time to get its work done. A person, of course, wouldn't have even thought about it as she stepped over the fabric and got to work.

Once the rover was on the surface, it had to go stick its sensor probe on a rock. This took another day or so (ignoring the communications problems, since we're not talking about hardware problems). A person would have touched the rock within a minute or so, and depending upon how long the probe has to be in contact with the rocks to do its thing, could have touched many more in the time it took the rover to touch one.

Now, if we wanted to figure out real costs to do science, we might consider how many different rovers it would have taken of the *Sojourner* variety to touch as many rocks as one man or woman could do in any amount of time you care to name.

Forget about it. One person could have not only sampled every interesting rock in view of the cameras, and on the first day, but also gone over the horizon to sample rocks over there, brought a camera with him to photograph the whole scene, brought some rocks back that seemed particularly interesting to look at later, and then at night answered journalist's questions about how it *feels* to be on Mars (oops—that's human spirit stuff—sorry).

One of the other things there was some excitement about was having *Sojourner* spin its wheels and kick up some soil to see what it was like underneath. Of course, the wheels were not optimized for this, and given the low weight of the vehicle, it couldn't kick up much dust no matter what it did. Our woman on the site could

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take a $5 garden shovel and do a better job in half a minute, or a regular shovel and dig a really nice trench and actually look at stratigraphy. Or better yet, take some soil inside and try to raise peas in it (since the life support system is already there for her).

I know this starts to sound a bit farcical—I don't think it could sound any other way. Much as I enjoyed seeing the new photos from Mars and watching the technical skill on display with the *Sojourner* rover, the fact is that for our few hundred million dollar mission, we got new photos from exactly one spot on the planet, and a rover that will never cover more surface area than my living room. Also, any scientific conclusions drawn from the limited data set acquired by the ***Pathfinder*** mission can never be anything other than hopelessly tentative (though they won't be treated that way). They are from one spot on the planet, and even though the general landing area was picked ahead of time, it is doubtful that the lander came down in the best spot in that area. A human could look around and find that best spot, in a way only possible when you're on site and it's possible for something to "catch your eye."

But it costs a lot of money to send people into space, many protest. Yup, that's true. But the question is how serious you are about your exploration, about how much you really want to know. Can anyone really be comfortable with scientific mission objectives written up by people who've never been to the place they want to explore—I mean, for all time?

The bottom line is, people who assert that robotic missions can meet all our scientific objectives have no way of knowing whether or not that's true.

Like I said, I enjoyed watching our robot do its thing on Mars. But I don't think claims that robots can replace people can hold any water until the day comes when we can send one of Asimov's positronic robots.

Or better yet—his Bicentennial Man. ■

The old-fashioned educators were not all so stupid as some modern educators would have us think. . . . It is not desirable to use ideas which excite interest, or may come in handy later as weapons, in this fundamental training of the mind. It is much better to compel the mind to busy itself with root ideas which do not mean very much to the child, because you are not trying to excite the brain, but to drill it.

—Aleister Crowley

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Edward H. Seksay

IN LOCO PARENTIS

When is an imitation good enough?

I'd only been with the Department for two weeks when Jeffrey Clark Smithers called for an appointment.

The fact that Smithers called first made him stand out from the crowd. The Cuyahoga County office of the Ohio Public Welfare Department wasn't much accustomed to polite scheduling. Ecstasy addicts and teenaged mothers usually just wandered in to see me.

I assigned Smithers a case number and dragged his social security number through state records. When I retrieved the search results Smithers seemed even more unusual: he had a steady job maintaining the servos at Cuyahoga Steel, no criminal record, and no prior history of state assistance. There was no apparent reason why he needed me. Smithers seemed so unlikely a client that I suspected my supervisor, Carter McGowan, had devised him as some sort of test for me.

Smithers entered my office late on a Friday afternoon dressed in union standard issue: charcoal gray khaki work pants, matching shirt and baseball cap, and black steel-toed boots. There was dirt under his fingernails. He removed his baseball cap and offered to shake hands. My remote—the urban, Caucasian, Cuyahoga County model—gave him a firm grip in response.

"What can the state of Ohio do for you, Mr. Smithers?"

"I'm not here about me." He squirmed in his chair. "It's my son."

My remote pretended to look at a piece of paper on the desk as I retrieved the name.

"That would be Michael?"

"Yeah, Mickey."

"What is it that Mickey needs?"

"I'm sick." Smithers looked at the floor. "Real sick."

After checking to ensure that Smithers had signed the standard confidentiality waiver outside, I scanned his med file. It disclosed growing lumps beneath each of his arms. The cancer treatments allotted by his health plan had run out before his lymphoma did.

My remote nodded its head and said nothing.

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"Mickey. He's special, you see. Needs looking after."

Michael Joseph Smithers had, according to the family med record, been born with his umbilical cord wrapped around his neck. Oxygen had been cut off from his brain for a crucial few minutes during delivery. Although an otherwise healthy twenty-three, he functioned at the level of a three-year-old.

"He's a bit slow is all. But he's a good boy. I want to be sure he'll be taken care of when I'm gone."

My remote nodded solemnly as I considered the situation. Census records indicated that Mickey's mother, Carol Clark Smithers, had died six years ago and left no surviving relatives. Smithers himself was an only child—his father had died before he was born, and his mother was a bedridden stroke victim who had been under the Department's care for a decade. With no family to look after him, Mickey would become a ward of the state as soon as Smithers died.

Having determined that public assistance was warranted, I defined the search: Living Assistance. Mentally Retarded Adults. Cuyahoga County. City of Cleveland. Near West Side. I processed the request and came up with the answer easily. McGowan would have to do better than this if he wanted to test me.

"The state operates group homes for people like Mickey. The one at 28th and Clark is closest to you."

"No!" Although the word came out forcefully, Smithers sagged into his chair like a deflated balloon, shaking his head in protest. "I don't want my boy in no home."

My remote pursed its lips thoughtfully as I tried to decide what to do. The shout had triggered a call for security, but I countermanded the order. Smithers was upset, but posed no immediate threat to my remote or any other state property.

That decision was easy, but I remained in a quandary otherwise. No one had ever rejected an answer within defined parameters before. McGowan would surely examine how I handled this situation.

Smithers took a deep breath and exhaled slowly. "I'm sorry," he said. "I'm sure your group home is all well and good, but a boy needs a family. Mickey's had to do with just me for too long as it is."

He pulled out a piece of paper and offered it to my remote. "I'm not looking for charity, mind you. The union has a good plan and there'll be money for Mickey so long as he's alive."

My remote pretended to glance at the summary of benefits as I went through the decision tree again. While the union benefits would provide Mickey with a monthly stipend after his father's death, they wouldn't come close to covering the cost of private care for the rest of his life. All of my protocols still called for the same answer: a state operated group home. But that response clearly wouldn't satisfy Smithers, whose silent stare was full of pain and frustration.

"I'll speak with my supervisor Mr. McGowan. Perhaps there's something else we can do."

"Thank you." A glint of hope

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brightened Smithers's eyes. "Thank you so very much."

"So, tin man. How did you do this week?"

My remote smiled blandly. The tin man comment was inaccurate—my prototype remote didn't contain an ounce of tin and was outwardly human in every way. As the only person in the Cuyahoga County office who knew me for who I really was, Carter McGowan understood that but chose to goad me anyway. I didn't bother correcting him. The comment was meant to get to me, but experience had taught me not to engage McGowan in banter. I tried to project nonchalance as my remote handed over the databoard containing my case summaries.

I watched McGowan intently as he reviewed the entries, checking them off one at a time, putting stylus to screen without comment, expecting criticism but hoping for approbation. The Automated Welfare System was still on trial then, and McGowan had been skeptical of my abilities from the outset. If the Cuyahoga County pilot program didn't go well, the whole project—including me and my prototype remote—would probably be scrapped.

I had reason to be concerned because Carter McGowan was a hard yardstick by which to be measured. As a licensed, clinical social worker and board-certified diplomate with over thirty years of experience, he had devoted his life to those on the margins of society, offering compassion to the ones who deserved help and doling out blunt truth when presented with the self-created problems of those who wallowed in pity. My ethical construct was derived from him.

McGowan's face remained expressionless until he came to my summary of the Smithers interview.

"Why did you set the Smithers case aside for further review?"

I wasn't sure what to say, and the lack of an immediate response triggered my remote's simresponse reflex. It took a conscious effort to keep my remote from shrugging. "I thought a special accommodation might be appropriate."

A hollow answer, devoid of rationale. It seemed to hang in the air naked.

"Hmm." McGowan stroked his neatly trimmed gray beard, a thoughtful pose I immediately cataloged for future use. "I thought that preprogrammed answers were your only specialty. What are you going to do?"

"Maybe try to arrange an adoption."

The answer was candid, but I immediately regretted my phrasing.

Maybe? Maybe? The uncertainty I felt was revealed in the very description of my proposed alternative. My remote surely had indecision stamped across its forehead.

McGowan, however, seemed not to notice. Although the consult room was windowless, he looked off into the distance as he concentrated.

"Difficult ordinarily," he shook his head. "And especially so with a special needs case. What'll you do if you can't find someone?"

Nanoseconds stretched endlessly as I considered the question.

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"I don't know."

McGowan put his stylus down. "What did you say?"

My answer was even less palatable when repeated: "I don't know what I'll do then."

"Now that's a first." McGowan rocked back in his chair. "But that's good."

Good? My revelation of inadequacy?

My remote's expression must have disclosed how I felt, because it made McGowan laugh. "Maybe there's hope for you yet." McGowan glanced down at the Smithers' case summary. "I tell you what. The confidentiality waivers have all been signed, so I want you to study this family closely and report back to me."

"What information do you want me to gather?"

McGowan shrugged. "I don't know. Just look into things and let me know what you find."

Buoyed by McGowan's unexpected tolerance, I decided to start gathering information as soon as possible. After leaving the consult room I dispatched my remote to its cradle for a systems check and recharge. For the next three hours I waited impatiently, screening incoming emergency calls, before regaining use of my mobile eyes and hands.

The address which Smithers had given me was in the low-rent, downscale portion of the near west side neighborhood known as Ohio City. Smithers and Mickey lived in a drab complex in the long, narrow block between Detroit Avenue and the Shoreway, sandwiched between freight transports crawling along on magnetic cushions and commuters who preferred the speed of acceleration by friction. Although the building overlooked Lake Erie, its view was blocked by an LED billboard which the landlord had erected in the backyard.

The cable port was at the rear of the building. My remote plugged into the unlocked exterior information jack and accessed Smithers's third floor apartment easily. The place was much too cheap for cybernetic firedoors or shielded lines.

The apartment was too small for a wallscreen, so I looked out onto the tiny living area from the peekaboo in the television screen—everything was built two ways, even back then—and saw Mickey Smithers curled on the threadbare carpet in front of it. His lean, six foot frame folded in on itself.

Mickey was watching a poorly animated Japanese cartoon about the adventures of a puppy dog and a frog. The colors were faded, as if the video had been bleached by time. Gray horizontal lines cycled from the bottom to the top of the screen every few seconds.

Mickey didn't seem to mind the low quality resolution.

Smithers sat in the adjacent linoleum-floored dining area, going over an array of bills on a small kitchen table that folded out from the wall. His workshirt hung over the back of his chair, leaving his white, tank top undershirt exposed. I could see the swollen nodes in his armpits.

Smithers tapped the television control inlaid in the table and the time flashed briefly in the upper right-hand

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portion of the screen. He watched Mickey quietly for a moment and hit the control again to turn the screen off.

"Time for bed."

Mickey rolled over to face his father. "No go bed now."

Smithers knelt by his son and rubbed the prickly stubble on Mickey's face. "You didn't use your depilatory today, did you? Did you skip your bath?"

Mickey frowned with concentration. "No daddy. Me took a bath. You help me."

"That was yesterday, Mickey." Smithers let out an exasperated sigh. "When are you going to learn?"

"Sorry Daddy." Tears formed at the corners of Mickey's eyes and he turned to hide them from his father.

Smithers grimaced, cursing himself beneath his breath. Then he began stroking Mickey lightly on the back, making a circular motion with his hand.

Mickey relaxed and yawned. After a quiet moment Smithers pretended to sniff the dirty white socks on Mickey's feet.

"Stinky feet." Smithers exaggerated another pretend sniff, rolled his eyes, and tickled the soles of Mickey's feet. "Whoa, stinky feet!"

Mickey began to giggle, and Smithers kept tickling. Mickey rolled over and his father sniffed at the feet again, feigning light-headedness. "Stinky, stinky ones." Mickey threw back his head and laughed, the tears on his face forgotten.

Smithers helped Mickey up off the floor and gave him a hug. "We'll just go night-night now. There'll be time for a bath tomorrow."

My remote waited as I watched Smithers helped Mickey brush his teeth and change into pajamas. They began to read a story and Mickey was sound asleep within fifteen minutes. Smithers pulled the blanket up from the foot of Mickey's bed to his chin, kissed his son on the forehead, and then went to bed himself.

Using my remote and surveillance cams I watched Smithers and Mickey for a week before reporting back. At the next review session my remote described the nature and extent of my observations. Then I displayed three representative excerpts on the monitor.

McGowan was enthralled. He even asked me to replay the 'stinky feet' scene that preceded Mickey's bedtime twice. When the monitor went dark McGowan had a warm look on his face.

"Children," he said. "There's nothing quite like them."

McGowan seemed in a good mood, so I tried for idle conversation: "What do you mean?"

McGowan cocked his head to the side. "Think of it this way—if emotions were the alphabet, prior to being a parent you only get to know the letters A through M. Once you have a child, you get to know N through Z. You feel better than you ever thought you could, and worse than you ever possibly could have imagined." McGowan glanced at the family pictures on his credenza. "And your children, like no one else in the world, can send you from one extreme to the other in an instant."

McGowan had never opened up

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quite so much before, and I wasn't sure what else to say. The moment didn't last long.

"So, tin man," he said. "What's your assessment of the Smithers family?"

I ignored the gibe and struggled to formulate an answer. Recounting what transpired in the Smithers's household was far easier than expressing a cogent opinion about it.

"A mix of emotions is present, especially in Mr. Smithers."

McGowan nodded, so I continued, finding the words as I went along.

"He is angry and sad about his own circumstances, frustrated with Mickey's shortcomings, and proud when Mickey succeeds at even the simplest of tasks. He worries incessantly that he will die before Mickey's future is resolved. Above all else, he has an enormous sense of responsibility for Mickey's well-being."

McGowan paid close attention to my every word, but I could not read his expression.

"Why did you show me the day when Smithers was interrupted at work?"

"Because it illustrated the wide range of Smithers's feelings for Mickey and how quickly they change."

Smithers worked at the Cuyahoga Steel reclamation facility in the industrial end of the Flats, one of the few places which still used nonautomated workers. On the day in question Mickey had sprained his wrist while going down a slide, headfirst, at the playground in the union's day care center. The staff called Smithers to report the accident just before lunch.

"At first Smithers was irritated and resentful of the interruption. When he learned that Mickey had been hurt, he became concerned. He was relieved only after he skipped lunch and saw for himself that Mickey wasn't seriously harmed."

The room was quiet as McGowan appraised my report. When he finally spoke, his words had a begrudging tone.

"Good work," he said. "Very good work."

I swallowed the compliment whole.

"How are things going on finding a home for Mickey?"

McGowan's question wiped away the dumb grin on the face of my remote. Despite my best efforts only one family—a couple with two small girls of their own—had even agreed to meet Smithers and Mickey. Although I was told that the meeting had gone well, the parents later informed me that they did not feel comfortable adding a sexually mature, retarded adult male to their household.

Nothing else had even come close.

"You were right," I replied. "Adoption does not seem likely. The suitable families are looking for infants, not problems."

"What will you do if you don't find a family willing to take Mickey on?"

My remote shrugged. "I still don't know."

I was no longer ashamed of the answer, and McGowan nodded in silent agreement. Uncertainty was becoming more and more familiar to me by then, like an acquaintance that simply refused to leave.

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* * *

Over the next three months I tried, without success, to find a home for Mickey.

As I met with Smithers each week, to report how things were going, the telltales of his condition became visible: ashen skin, sunken cheeks, near constant fatigue. But Smithers's resolve grew even more determined as his physical condition deteriorated. Although McGowan had always said not to promise what couldn't be delivered, at our last meeting I found myself telling Smithers that I wouldn't give up until I found a proper home for Mickey.

Those words, perhaps, were what he needed to hear. Smithers died at St. Margaret's Hospital the following Saturday afternoon, alone, to spare Mickey the trauma of being at his bedside.

The state formally became *in loco parentis* for Mickey the moment Smithers died. Although it was the weekend, I roused my remote from its cradle and dispatched it to Smithers's apartment to relieve the sitter I had arranged. Department regulations were clear—the state would only pay for in-home care as a stopgap measure during a parent's medical emergency. With Smithers dead, I could no longer justify keeping her there.

Regulations also required that Mickey immediately be placed in the nearest group home because a foster setting had not been found for him.

As my remote made its way to the apartment, I mulled over that particular departmental mandate. The group home at 28th and Clark was a modern facility, and each patient room came fully equipped with excellent holographic capabilities to assist with therapy. If I took Mickey there I could probably infiltrate the place at night and appear to him as his father. Over time I could probably even manipulate the budget to have a remote constructed that would be Smithers' identical twin.

But anything I conjured, whether holographically or mechanically, would only look and sound like Smithers. Mickey might never realize the difference, but I would know. It would still be me, inside, trying to decide what to do.

Something had to be done. I just didn't know what.

When I arrived at the apartment Mickey was looking out the front window towards Detroit Avenue, staring past the wooden train set placed on the sill. The baby-sitter, a young woman just barely past Mickey's age herself, left hurriedly.

"Mickey?" I said, not knowing what to expect.

Mickey kept his back to me, and idly picked up the caboose from the train set with his right hand.

"Where Daddy goed?" he asked.

"Daddy can't be here right now Mickey."

"No!" Mickey turned, threw the caboose at my remote, and started to cry. His eyes reddened as the tears rolled down his face. "Daddy working," he sniffled. "Back soon."

"No, Mickey. Your Daddy's not at work. He's dead." Mickey looked at my remote uncomprehendingly. The concept was beyond him. How could I make him understand? "Mickey,

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your Daddy's not hurting anymore but he can't ever come back here." My remote extended its arms towards Mickey with palms upraised. "I'm sorry."

Mickey swept the train set from the windowsill to the floor and stamped his feet. "No fair. Me want Daddy. Now!"

My remote went over to Mickey, but he threw himself down to the floor. My remote knelt down next to him and rubbed the small of his back.

"I'm sorry that Daddy can't be here Mickey. It's not your fault."

Mickey kept crying uncontrollably. "No want you," he said. "Get me Daddy."

There was no comforting him. In an act of desperation my remote picked up the engine from the train set off the floor.

"Is this yours?"

Mickey glanced at my remote and his crying subsided a notch.

"I think I'd like to play with this." I put the toy engine on the floor and pushed it. It rolled past Mickey's nose and came to a stop against the wall.

Mickey raised himself onto his elbows and grabbed the engine.

"Mine," he said. "Where coal car?"

My remote retrieved the coal car as Mickey wiped his nose against his shirtsleeve. Soon the entire train was reconstructed on the floor.

After about ten minutes of silent play Mickey looked up at my remote and asked "What your name?"

The question threw me. Smithers had known me by the pseudonym I used in the office, a white-bread name which didn't mean much, because if the Cuyahoga County pilot program worked, each of my remotes across the state would have a name which corresponded to its apparent ethnic origin. I didn't really have a name, then. All I had was a function. McGowan said that deception never worked with children, so I decided upon candor and identified myself to Mickey as I never had to his father.

"They call me the Automated Welfare System."

"Otto - May - Ted . . ." Mickey's voice drifted off and he got a blank look on his face.

"Automated Welfare System."

Mickey frowned with concentration. "Otto - May - Ted Well - Fair Sis-Tim."

"That's right Mickey."

"Otto," Mickey repeated.

"Otto." My remote nodded. "Yes, Mickey. That's right."

Mickey beamed, went to his toy box, and removed some building blocks. For the next few hours we built and destroyed skyscrapers.

Mickey was already yawning when I told him it was bedtime. Calling upon the information obtained during surveillance, my remote helped Mickey brush his teeth and change into his pajamas.

After Mickey got into bed he pulled the covers up around his neck and said, "You read me book?"

"Sure Mickey." I pulled a book from the nightstand and read quietly, sneaking elements of his father's voice into that of my remote. He was sound asleep before long.

My remote sat motionless by Mickey's bedside as he slept. Mickey's face was relaxed, displaying in sleep no

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trace of mental handicap. Smithers must have been proud to have a son such as this.

I watched him all night, every toss and turn.

"Are you crazy?"

I hadn't expected a warm reception from McGowan, but at least he didn't call me tin man.

"No." My remote shook its head slowly, to conserve energy. Having spent the entire weekend with Mickey, it hadn't yet gone back to its cradle for a recharge. "I just thought that I could take care of Mickey until a foster placement is arranged."

McGowan regarded my remote curiously. "Tell me," he said, tapping his forefinger against his desk, "why do you want to do this?"

"Mickey doesn't belong in a group home. It's not what Smithers wanted and it's not the right place for him."

McGowan seemed to ponder my answer, although I knew he agreed with me. What would it take for me to convince him?

"There may never be someone who wants to adopt Mickey. Did you ever think of that? What would you do then?"

McGowan watched my remote while waiting for a response, as if he intended to weigh my every word.

"I don't know." The admission which once seemed so foreign tumbled out easily now. "Just continue taking care of him for as long as it takes, I guess."

"What makes you think you have what it takes? It's not easy being a parent."

My remote sighed, despite myself. Not easy? My remote had just been on nonstop tour of parental duty for thirty hours straight. Tell me about it.

"You told me once that first-time parents pretty much have to make it up as they go along. I'm in the same position, only better, because I have instant access to just about any child-rearing book that's ever been written. Besides, I've watched this boy and his father for a while now. I know their routine."

McGowan closed his eyes and rubbed his forehead. I could tell that he was wavering.

"Where is Mickey now?"

"Outside in the waiting room."

"You brought him here?" McGowan scowled. "Did anyone see you?"

"Perhaps." My remote shrugged. "What's the matter with—"

McGowan cut me off with a wave of his hand. "If our supposed colleagues find out you've taken Mickey into custody it won't be long before word filters down to the lobbyists outside the governor's office. The ones telling her not to put a machine in charge of people's problems, no matter how cost-effective it might be. My recommendation about the program is due a week from today. Do you really think this is the time to go out on a limb? Do you realize what will happen if the decision goes against you?"

My remote stared at McGowan impassively, because I knew exactly what he was talking about. The power to my main grid had accidentally been shut off once. Imagine losing your senses, one by one, as if locked in a dark closet, only then to have consciousness itself slip away, an elec-

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tron at a time, while being helpless to do anything about it.

"I know what's at stake." My remote nodded numbly, chastised. "I suppose I should have thought beforehand about how things might look."

"You sure as hell should." McGowan glowered at my remote, and forced himself to take a deep breath. "Listen—I'm impressed with how you've handled the Smithers situation, and I actually agree with your conclusion about the group home being the wrong place for Mickey, but that's all beside the point right now. As much as I hate to admit it, you can be of enormous help to a lot of people across this state, much more than I or any other single person."

McGowan acknowledging my abilities? Saying that I could actually be of some use? The unexpected news was so welcome that I found myself having to concentrate to hear the rest of what he had to say.

"But if I approve of you taking care of this boy my credibility in recommending implementation of the Automated Welfare System could be destroyed." McGowan threw his hands up in the air, a gesture that looked as though it pained him. "I'm sorry, but there are lots of Mickeys in the world. One of the things that you've got to learn about this job is that you can't just go around taking in strays. Get that boy out of here and over to the group home, pronto. Understand me?"

With a conscious effort I had my remote nod assent. McGowan believed in me! Half in a daze, I sent my remote out to the reception area to reclaim Mickey.

Mickey took my remote's hand and led it to the pile of toys in the corner where he had been occupying himself, to show off a fort he had constructed for the stuffed animals there. I complimented him on a job well done, and his face drank in my approval.

Mickey took my remote's hand compliantly as I led him away. He would follow wherever I led, and the unvarnished instructions I had just received left no question as to what our destination should be.

Mickey paused outside the waiting room and turned his head, puzzled. "You OK Otto?"

Mickey's eyes were wide with concern, but I didn't honestly know how to reply. I was on the verge of winning McGowan's approval, something I had longed for since becoming self-aware. But at what price?

"I'm fine, Mickey." I had my remote reach over and tousle Mickey's hair. "Thanks for asking. Let's go home."

I lived a double life the rest of that week.

I reinstated day care arrangements for Mickey at the apartment with just a few calls. That was the easy part. Sneaking in cradle time for my remote was more difficult, but I managed by having my remote come in from the apartment early enough to seem as if it had been in its cradle all night and by having it return to the cradle once McGowan left for the day.

I didn't talk much with McGowan that week, nor did I want to. I wasn't sure I could lie to his face about Mickey and didn't want to try. I just kept telling myself, with some sense of re-

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lief, that my future would soon be decided and that it was pointless to make any permanent decisions before then. During the day I concentrated on doing my job. Each evening I made the most of my time with Mickey.

The week ended without a further clue from McGowan as to what his recommendation would be, and I was full of bleak thoughts as my remote went to the apartment Friday evening. It had been a tough week in and outside of work. While the consistency of my presence had built up some measure of trust with Mickey, he still lapsed into hysterical crying each time he thought of his father. I wasn't sure how I felt about having two whole days alone with Mickey and feared that I had made a mistake in ignoring McGowan's orders.

We did nothing extraordinary that night or the rest of the weekend, but life with Mickey was pleasant for all its mundaneness—a cycle of eating, washing, playing, and sleeping that repeated itself with minor variations. I found in Mickey much of the same comforting consistency he derived from me.

On Sunday night I put Mickey to bed and, as by then had become custom, read him a story. Mickey curled up beneath the covers, dreamily attentive to my remote.

"Otto?"

Mickey was still awake, but his eyelids were getting heavy. "Yes, Mickey?"

"I tired." Mickey yawned and pulled his blankets up to his chin. "You give me kiss goodnight?"

"Sure, Mickey." My remote bent over and kissed Mickey on the forehead. He smiled, turned onto his side, and began to snore gently.

I had my remote stay at Mickey's bedside for a while afterwards, content just to watch him sleep. Although I had not yet found definitive answers for either of us, for the time being Mickey was happy and so was I. Each rise and fall of Mickey's chest gave me more satisfaction than any meager bit of approval which McGowan had ever deigned to bestow.

As my remote turned out the light in Mickey's room there was a knock at the apartment door. When I opened the door McGowan stood there, looking bemused.

"Otto, huh?" McGowan shook his head and snorted. "Mind if I come in?"

My remote swallowed hard. "How did you know?"

McGowan walked down the corridor into the central living area before answering. "The fluctuations in your cradle use were a giveaway. Besides, I was watching you."

"You watched me?"

"Sure. I could tell how you felt about this kid. What do you think I am? Stupid?"

"No." My remote shook its head. "While there are many words I can think of to describe you, stupid is not one of them."

McGowan furrowed his eyebrows and stared at my remote with mock seriousness. "Tin man, if I didn't know better, I'd say that you were making fun of me." McGowan smiled. "But of course you don't have a sense of humor, do you?"

"I guess it wouldn't matter much

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now if I did, would it?" My remote slumped into the chair where, not long ago, I had seen Smithers sit watching his son. "Can you at least wait until the morning before taking Mickey to the group home?"

McGowan shook his head. "The boy's not going anywhere. And neither are you."

"What?"

"I'm sure that eidetic memory of yours heard what I said. Mickey stays here and, if I can sell my recommendation to the governor tomorrow, you'll have plenty of time from here on in to develop your funny bone."

"But you told me to take Mickey to the group home and I disobeyed."

McGowan shrugged. "Of course you did. Tin man, I wasn't absolutely sure you could do your job until this past week. Until Smithers came along you were able to play everything by the book. But then you were confronted with a messy situation that required independent thinking. The type of problem that has no easy solution—the kind that make this job worth doing. I ordered you to let Mickey go just to see what you would do. I wanted to see if," McGowan leaned over and tapped my remote on the chest, "you actually had a working ethical construct in there to go along with all the circuitry. It's one thing to know a series of prescribed answers, and quite another to feel empathy deeply enough to put yourself on the line. As for disobeying my orders, well, don't make a practice of it. But some of the best decisions I ever made came after I told my supervisor to go stuff himself."

My remote feigned a deep breath as I tried to collect my thoughts. "So what happens next?"

"For starters, you and I never talk about this again. I wasn't kidding about those lobbyists down in Columbus, so you've got to doctor the Department's records regarding Smithers and Mickey. Paper the file to make Mickey disappear in a way that doesn't attract attention. And then," McGowan started heading toward the door, "do your best to live happily ever after."

My remote nodded silently as I began to implement McGowan's suggestions.

McGowan reached the door and turned so that he was framed by the threshold. "Good luck," he said. "You'll need it."

That was twenty-five years ago.

Today Mickey and my original remote are at Brookside Park. It's late autumn and there is a chill in the air. We've been collecting colored leaves to decorate the apartment for Halloween.

Mickey is sprawled in the dirt, tirelessly examining an anthill he discovered beneath a deep crimson maple leaf. His head is topped now with thinning, gray hair. There are thirty like him under the undocumented care of my remotes across Ohio, each ongoing challenges in their own way.

Uncertainty is now an accepted component of my life. I do what I can for each of my adopted children, learning from one what I can try to give to the next, always striving for—but never quite attaining—any true consistency. The responsibilities and fulfillment of parenthood are at the core of my existence.

It's a great job. ■

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Michael F. Flynn

RULES OF ENGAGEMENT

"Might makes right" is a tempting slogan. But does multiplying one side of the equation automatically multiply the other?

Winter having locked the passes with snow and ice, the brass parceled out long-deferred leaves and junior officers scattered across the country. Some descended on their hometowns to rest in the bosoms of their families. Some came to the City to sample the fleshpots—and rest in other sorts of bosoms. That was the last winter before the big offensive, when I still had the flat in Chelsea. Jimmy Topeka dropped in to see me, all somber as always. He seemed to have something on his mind, but he talked around it six ways from Sunday the way he always does, and hadn't gotten to the nub before Angel Osborne clumped his way up the stairs. I hadn't seen Angel in almost three years, though he and Jimmy had crossed paths during the Red River campaign. I said how we lacked only Lyle "the Style" Guzman to make the old gang complete; and the Angel ups and beeps him over the Lynx and, wouldn't you know it, Lyle was in the City, too. So before long we were all together, just like old times, drinking and shooting the shit and waiting for the Sun to come up. Those were wild years, and we were still young enough to be immortal.

I hadn't much in the way of furniture; and once Angel had occupied two-thirds of the sofa, there was less of it to go around. Lyle, being slightly built, perched himself on the table, while Jimmy raided my kitchen and

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passed out bottles of Skull Mountain before squatting cross-legged on the floor. We all said what a coincidence, and long time no see, and what've you been up to.

It wasn't quite like old times. A few years had gone by between us. They were long years; it didn't seem possible they'd held only three-hundred-odd days each. The four of us had been different places, seen different sights; and so we had become different men than the ones who had known each other at camp. But also there was a curtain between me and the three of them. Every now and then, in the midst of some tale or other, they would share a look; or they would fall silent and they'd say, well, you had to be there. You see, they'd been Inside and I hadn't; and that marks a man.

Angel had served with the 82nd against the Snakes; and Lyle had seen action against both the Crips and the Yoopers. Jimmy allowed as he'd tangoed in the high country, where the bandits had secret refuges among the twisting canyons; but he said very little else. Only he drank two beers for every one the others put down, and Jimmy had never been a drinking man.

They asked politely what I'd been up to and pretended great interest in my stories and news dispatches. They swore they read all of my pieces on the Q-Net, and maybe they did.

They didn't blame me for it. They knew I'd as soon be Inside with them, suited-up and popping Joeys. The four of us had been commissioned power suit lieutenants together; had gone through the grueling training side by side. I still had the bars. I still looked at them some nights when the hurt wasn't so bad, when I could think about what might have been without feeling the need for chems.

Talk detoured through the winter crop of Hollywood morphies and whether American could take Congress from Liberty next year, and how the Air Cav had collared El Muerte down in the panhandle, and have you seen Chica Domosan's latest virtcheo. Angel and Lyle practically drooled when I told them I had the uncensored seedy; and they insisted on viewing it right then and there. I only had the one virtch hat, so they had to take turns watching. With the stereo earphones and the wrap-around goggs enclosing your head it was just like she was dancing and singing and peeling right there in front of you.

Afterwards, we talked Grand Strategy, shifting troops all over the continent, free of all political constraints and certain we would never hash it the way the Pentagon had. Doubt flowers from seeds that spend decades germinating; confidence is a weed that springs up overnight. And so youth gains in certitude what it lacks in prudence. It was no different back then; only, the stakes were higher.

Eventually, we spoke of our own personal plans. Lyle went how he was angling for an assignment down in the Frontera—"because that's where the next big yee-haw's going to be"—and Angel wanted nothing more than to hunt Joeys up in the Nations. White teeth split his broad, dark face. The rest of us counted the Nations as a nest of traitors and secessionists; but

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with Angel it was personal. Then Jimmy said, in that quiet voice of his, that he'd put in for a hoofer. We grinned and waited for the punch line, and when it didn't come our smiles slowly faded. "I'm serious," he said. "I won't go Inside again."

Angel looked shocked and Lyle's face stiffened in disapproval; but I was the one who spoke up. "How can you say that, Jimmy? After what we went through together in camp? You're a suit lieutenant, goddamn it!" Dismay pried me from the chair behind my cluttered workstation; or rather, it tried to. My legs betrayed me and I nearly cracked my head on the edge of the desk as I toppled.

The others were all around me, to lift me back up again. I swatted Jimmy's hand away and let the Angel bear me up and set me back in my accustomed place. "Why'd you do that, man?" Lyle asked as he fussed the blanket around my waist. "You shouldn't oughta do that." Jimmy wouldn't meet my eyes. Jimmy always blamed himself, but it was my idea. We'd just gotten our bars, we were celebrating, and that hog of Jimmy's looked phatter and stoopider the more I drank. So what the hell. That was then.

"I get around all right," I said to excuse myself. I could function. Most days, I could even walk. "Sometimes, the spasms—You know."

They all said they knew; but how could they? You dream and you train for months and months and then in one drunken moment you throw it all away for a goddamned motorcycle ride. Power suits amplify the suit louie's every move. A man can't wear it if he suffers unpredictable seizures. As if to underscore my thoughts, my left leg began to spasm. If I'd been suited up, my walker would have toppled. Stress, the doctors all said. It was stress that brought it on; but what did they know?

I was barred by circumstance; but Jimmy planned to walk away. That made no sense. Who would give up a power suit if he didn't have to? Angel was puzzled, too; and Lyle said, "Sometimes a guy gets syndrome and he just can't take being Inside no more." He was so damned understanding that Jimmy flushed and said how it wasn't that at all; or at least, not exactly.

"You know how things stand up in the mountains," Jimmy said. "I don't suppose it's much different with the Yoopers or the others, except maybe the terrain's rougher. Straight up or down as often as not, and canyons pinched as tight as a preacher's wife on Sunday. Officially, the whole area's pacified; only someone forgot to tell the militias."

"They are not 'militias,' suit lieutenant," said Angel in a mock-official voice. "They are 'bandits.'"

"I know that," Jimmy told him. "We only *call* 'em 'militias.' Like you say 'gangs' when you pull urban duty." He swigged his Skull and sat with the bottle dangling by its neck between his knees while he scowled at nothing. "The war's platoon-size up there," he said at last. "The regiment's scattered in firebases all across God's Country—only God ain't home. The only time I ever saw my colonel was over the

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Lynx. We got our orders—when we got any orders at all—from the twenty-four. Otherwise, we were on our own." He shook his head. "Pacified . . ."

"Who was your colonel?" Lyle asked.

"Mandlebrot. He was a sumbitch. Worried more about the cost of patrolling than whether Joey walked the line. When I took the platoon out, I used to sling the word off the twenty-four, then put my dish tech on arrest so I could say I never got the bounce-back telling me to stay put."

Angel laughed. "That's good. That's bean. Wish I'd thought of that."

That was the sort of hack Jimmy used to pull. Always by the book, but sometimes he wrote notes in the margins. "How long did you fool him?" I asked.

"Oh, not long," Jimmy admitted. "I said he was a sumbitch. Never said he was stupid. So sometimes I would go out unofficial-like with the reg'lar militia—the sheriff's posse. They had their own ATVs. Horses, too. Some places hooves'll take you where tires won't go. They were locals, and knew the country just as well as the bandits. I mean they knew it close up, like you know your girlfriend, not just from the up-and-down."

"You were too far north for the twenty-fours?" asked Angel.

Jimmy shrugged. "Nah, but the twenty-fours can't give you terrain detail the way a LEO sat' can. Sometimes a little sliver between canyon walls was all the sky we could dish. There's always *something* up there but you have to code dance, depending on what sat' your dish can catch. Well, that sheriff was a clever pud. Didn't need an eye in the sky, because he had eyes and ears all over ground level—and kept his county in pretty good law 'n' order, considering. But he knew when he needed extra weenie, so he was happy enough when I tagged along. Not *happy*, you understand; but happy enough. The irregulars don't much like us; but they hate the bandits worse—'cause it's their brothers and cousins and all getting kneecapped and necklaced."

"An' half the time," said Angel, "it's their brothers and cousins and all that're *doing* the kneecaps and necklaces."

"Word up," said Lyle. "Neighbors huntin' neighbors. No wonder they ain't happy campers."

"Folks back here don't always draw a line between bandits and friendlies," I said, thinking about my ©-Net story, "The Loyalist." "So your possemen feel they have to prove their loyalty."

"Righteous beans," said Angel. "Hey. You hear what happened to the 7th down in the live oak country? 'Rooster' McGregor—you ever meet 'im? Skinny guy with teeth out to here?—he was doing just what you were, Jimmy. Riding with the posse when he couldn't take his platoon out. Only it turns out the possemen *were* the bandits. Deputy Dawgs by day; camos and piano wire by night. Rooster, he got his ticket stripped over it, but he accidentally hung the sheriff before the court martial took his bars."

Jimmy hadn't been listening. "They don't respect us," he said. "Never understood that 'til the last time I was In-

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side. Now . . ." He voice trailed off and his eyes took on a distant look. I traded glances with Lyle and Angel, and waited.

"We called him 'Wild Bob,'" Jimmy said finally. "I suppose he had his own name for himself and some mumbo-jumbo, self-important rank. Generalissimo. Grand Kleagle. Lord High Naff-naff. Maybe he called himself The Bald Eagle, cause he sure as shit had no hair; but he could've called himself Winnie the Pooh, for all I cared. 'Cause what he was was a murderer and a rapist and an armed robber, and he probably picked his nose in public. What he'd do every now and then—just to let us know he was still around—he'd send a body floating down the river from the high country. One of our agents or a friendly or maybe just someone looked at him cross-eyed. Or he'd throw a roadblock up and collect 'tolls' from everybody passing through. Or he'd yee-haw a firebase and pick off a freshie or two.

"Yeah, he was a piece of work, all right," Jimmy said. "And he knew to the corpse just how far he could push it before the higher-ups would scratch their balls and wonder how 'pacified' the area really was. So Badger Stoltz—that was the sheriff—he developed a keen interest in learning Wild Bob's whereabouts. One day, word came in that Bob was holed up in an old mining town, name of Spruce Creek. The silver gave out way back when, but no one had the heart to close it up. I seen the place, and I can't say I blame 'em. It's a spot worth stayin' in, just to open your eyes to it in the morning. It sets in a high, isolated meadow, with peaks on every side and four passes leading out. A spruce forest surrounds it and climbs halfway up the mountain flanks before giving way to krummholz and bare, gray rocks. The state road follows the creek through the center of town; but the Joeys have watchtowers on both east and west passes and it wouldn't take 'em more'n ten minutes to turn either one into a deathtrap if anybody tried to come in that way. The townies either support Wild Bob or they're too scared not to. Or both. Hell, like I said, even the friendlies don't much like us. And I can't say they weren't given cause in the old days."

"Don't mean nothin'," Angel said. "Don't excuse what they done. Don't excuse collaborating, neither."

Jimmy just shook his head. "It's a damn shame what things have come to. Gimme another Skull, would you."

Lyle handed him the bottle. "So what about this Wild Bob?"

"I'm comin' to it." He popped the cap and tipped the neck toward us in salute. "In and Out," he said.

"Yeah." That was Lyle. "Except you want Out."

Jimmy darkened. "I said I was comin' to that. I just gotta give you the topo. There's another road. A county road. Packed dirt and gravel, mostly. Comes in from the south, gives the townies something they can call an intersection, and meanders out over the north pass. At that point whoever put the road in, must've figgered out there wasn't any place to go over on the other side; so it just fizzles out in the rocks and tundra. The Joey's keep an eye on

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the south pass, but don't pay much mind to the north."

Angel spoke. "I sense a plan," he said clapping his hands together. "A Strategy."

"Four suit louies," I said. "Two to keep 'em interested in the state road; one to block their retreat over the south pass; and one to sneak in through the bathroom window."

"Sure," said Jimmy, "except I didn't have no four suit louies at the firebase. Just me and Maria Serena—and one of us had to stay Out if the other went In, in case Joey yee-hawed the firebase. Wild Bob had maybe twenty, twenty-five bandits with him—he ran the town like a damn safe house, and every terrorist in three states could put up there for a week or two. I had the sheriff's posse—Badger Stoltz and ten whipcord guys who took their tin stars serious—and I had my power suit. So I figured the odds at better'n even. Plan was, the sheriff would waltz with our boy on the county road, draw 'em south a ways, while I took the walker in from the north."

"Couldn't use a floater, then?" Angel asked.

Jimmy shook his head. "Too steep. Ground effect don't work too good when the ground is vertical. I'd have to do finger and toe climbing the last stretch. There's a *reason* that road don't go nowhere. Sheriff sent one of his guys with me—a cute little bit named Natalie who just happens to be his daughter—to show me the way. I had the photos from the up-and-down, but like I said, things can look real different on the ground. Me and Stoltz worked it out and didn't say beans to nobody until the day I went In—'cause, you know, someone might have a cousin or talk in his sleep or something. So the day comes and Stoltz rides his ten guys south—they got the most ground to cover before they get in position—and Natalie waits while I go into the teep room and wriggle into my power suit—"

"Duck into a phone booth!" said Lyle. "Put on your cape and Spandex!"

"Superman!" said Angel. "Ta da-daaah!"

"—Fiber ops and hydros hooked up—"

"—Leap tall buildings—"

"—Set my virtch hat—"

"—Faster than a speeding bullet—"

"—Power up the suit and—"

"Oh, man, I *know* that feeling—"

"—Ain't nothing like it—"

They bubbled, their words tumbling one atop the other, a glow spreading across their faces. I remained quiet and stared into my beer. I could remember what it felt like. Infinite power. You could dribble the world and shoot hoops. My fingers cramped into a sudden ball and I hid the rebellious limb under the desk.

"I took the walker out to the firebase perimeter and leaped over the wall right beside Natalie."

"Yee-haw!" said Lyle.

"It scared her. She hadn't been expecting it, and her horse reared up and near threw her. I told her I was ready-Freddy; and she just looks in my optics and says, let's not waste any more time, and she yanks on her bridle and heads off toward Spruce Creek." Jimmy drained his bottle and tossed it to Angel, who placed it care-

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fully in the growing architectural wonder our empties were creating.

"The town wasn't too far, as the bullet flies; but you couldn't rightly get there going straight. Still, her dad and the others needed time to get in position, so Natalie set off at an easy canter with me loping along beside her. You know what it's like in those walkers. You want to leap and soar. And of course it's scaled about twice the human body, so you have to get used to the difference in stride and reach and squeeze. So I'd stretch my arms and the walker's manipulators would reach out and tear a limb off a cottonwood. Or I'd take a couple giant steps, just for the hell of it; then wait for Natalie to catch up. Third or fourth time I did that, she told me I was scaring her horse and please stop; so I had to plod the rest of the way. It was like being hamstrung."

"Hang a handicap sign on your back," Lyle agreed. "Get prime parking."

"Tell it, Brother Lyle!" said Angel. They tossed the thoughtless jape from one to the other.

"Satellite recon is a wonderful thing; but even the up-and-down can't see through trees or overhangs or pick fine details from a shadow-black canyon. Natalie led me the last part of the way. Took me down game paths, along a creek bed, through stands of Douglas fir that looked like they'd been there since God spread his tarp. She knew her horses, that Natalie. Couldn't have been more'n nineteen, twenty; but she sat in the saddle like she'd been born there. Well, in that country, maybe she had. She never said more'n two dozen words to me the whole trip; and those were mostly 'this way' or 'over there.'

"Finally, we come to the base of a sheer cliff. There was three canyons cut into it. No, not even canyons. More like cracks. Recon barely showed 'em, but Badger Stoltz and his daughter swore there was one of 'em led to the top. Natalie rode along the base of the mountain and ducked a little ways into each. Then she come out and said, 'The right one. It slopes up real sharp, then goes vertical into a chimney that opens out on the high tundra. From there, your GPS should show you the way.'"

"Wasn't she going with you?" asked Angel.

I snorted. "Weren't you listening? Take a horse up a fissure like that?"

Jimmy rubbed his palms together. "I said, 'Wish me luck?' and she just yanked on her horse's reins. 'You don't need luck when you've got *that*,' she said. I knew she meant the walker, so I come back and said, 'I ain't no Imperial Storm Trooper and Wild Bob ain't the Rebel Alliance. I'm on *your* side. We're the *good* guys.'

"'The good guys,' she said. And, oh, she was pissed. Angry and afraid all at once. 'Was *your* government ragged on folks until bandits like your Wild Bob could play the hero? And now my daddy has to ride out and maybe take a splash of fléchettes in his belly, 'steada ticketing speeders along the state road.'

"'He ain't *my* Wild Bob,' I said. 'I come to take him down.'

"Her lips curled. Full, soft lips. Oh, they were lips for kissing. And here I

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was a young suit louie going off to do battle. I deserved a kiss. But I was suited up, teeping a walker, and there was more than telemetry and digital screens between us. Instead of a kiss, I got a kiss-off. '*You* come to take him down?' she said, and she leaned forward over her horse's head and pointed a finger into my optics. 'You listen to me, mister "suit louie." If my daddy even gets wounded bad, you'll have one more militia in the high country to worry about, and that'll be me!'

"Hoo!" said Angel. "And she'd be a bad 'un, too."

"She was just worried about her Pa," I suggested. Jimmy looked at me, then shrugged.

"Maybe. I couldn't let it bother me, though. I had a job to do; and if I *didn't* get up that cut, her daddy probably *would* take a slug. Without me, the possemen were outnumbered and outgunned."

"So how'd you do it?" Lyle asked. "Sounds like you'd be out of line o' sight in that fissure."

"Oh, I had an aerostat hovering at the relay point, and Lieutenant Serena kept it on station. But you're right. Inside that chimney, the microwave beam would be blocked. So I asked Natalie to handle the little dish. You know, stake a repeater at the entrance, then crawl after me with the parabolic until I got up to where I could bounce sky again."

"Helluva thing to ask a girl," said Angel.

"Did you trust her?" I asked.

"You don't get it, Angel," Jimmy said. "She was a posseman, not just the Badger's daughter. She packed a nine and a railgun and there was a street sweeper in her saddle scabbard. Oh, *mano a mano*, any one of us could have taken her down; but we'd be walking funny for a long time after.

"Well, I took that walker into the cleft and it was like someone drew a window shade, you know what I mean? All the I/O was juiced into the walker's receptors by that little, handheld parabolic that Natalie Stoltz held. All she had to do was toss it aside, or even drop it accidentally, and that walker would be nothing but a pile of armor and circuitry stuck inside some rocks.

"I can't say I didn't think about that while I climbed that chimney; and what the colonel would say if I got stuck while I was on an unofficial outing. What I didn't think about until later was Natalie. My walker depended on the power beam she was aiming, and the farther up the cleft I climbed, the harder it was to keep the beam targeted. She had to stand right underneath the walker and aim straight up. So if anything happened, that'd be a couple tons of composite armor and metalocene plastic come tumbling down on her head."

"Takes balls," Angel agreed. "I wouldn't care to do it."

"Almost made me wish the walker was self-powered."

Lyle hooted. "Yeah, right. Carry a honking fuel cell around."

"Said 'almost,'" Jimmy told him. "The climb was the sort of workaround any good suit louie could pull off. Maybe a little closer to the edge, is all. Took me maybe half an hour to reach the top. I looked down over the edge to maybe wave Natalie my

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thanks, but all I seen was her riding off a-horseback without so much as a glance back."

"Not very grateful for your help, was she?" Angel said.

"Found out later she went 'round the long way to hook up with her dad. Can't fault her—her place was with him. Got there too late for the action, but then old Badger might've have that in mind when he assigned her to guide me."

"That must have been some climb," I said, "teep shadow, and all." I tried to keep my voice professional; but some of the envy must have come through, because Jimmy winced and wouldn't meet my eyes.

"Yeah, some climb," he said, and gave no more details.

Lyle leaned forward. "But once you were out of the cleft, you could bounce . . ."

"Yeah. Got my bearings from the GPS, shook hands again with the aerostat, checked in with Serena and Stoltz. Gauged the distance and told Stoltz I'd call him when it was time to open the dance. Serena said there was no movement on the up-and-down; but hell, those bandits know how to get around without smiling for the sat'-cams. Anything worth noticing would have been under trees or camo overhangs or down in the bunkers. You know how it is."

Lyle and Angel said they knew how it was. I chimed in, too; but for me it was more a theoretical knowledge, cadged from recon photos, official briefings, or picking the brains of Insiders. I'd written about it in "The Ambush." People tell me how my stories make everything come alive for them—a funny expression to use about stories of combat—but only I knew how dead the words felt under my fingertips.

"There was this one building, though, seemed to have a lot of in-and-out. The Artificial Stupid thought it was either a headquarters, an entrance to the bunker system, a whorehouse, or a public library."

Angel shook his head. "Jesus. No wonder they call 'em Stupids—"

"You put up any bumblebees?" asked Lyle.

"About two hives, all slaved into the aerostat relay. Gave me a good, close-in aerial of the town, so I knew right where the action was. I figured folks'd come pouring out of that building when the Badger opened the dance, and I wanted to know if they came out waving Kalashnikovs or library cards."

"Shoot 'em if they have the cards," said Lyle. "It's the shit they read drives 'em to it."

"You don't believe that, Lyle," I said.

He stuck his chin out. "You're the writer," he said. "Either you move people or you don't. And if you don't, why bother writing? Maybe there'd be fewer murdering rebel scumbags if we'd put some of those books and websites off-limits."

"No," said Jimmy. "I'd rather shoot a man dead because he's a murdering rebel scumbag than treat him and everyone else like children who're told what they can read or listen to."

Lyle was unconvinced. "Yeah? What do you owe Joey Sixpack?"

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Jimmy said, "I'm coming to that part." He leaned forward and rubbed his palms against his lap. We had run out of beer already—not unusual when the four of us gathered in those days—but no one volunteered to make a run, which *was* unusual.

"I walked my machine to a low ridge overlooking the town and scanned the target with my high-rezz 'nocs. It was just like the Badger figured. No one was watching the north. Just to be on the safe side, though, I turned on my pixelflage."

"Me," said Angel, "I just boogie right on up."

I didn't think there was any imputation of cowardice in what Angel said, but I pointed out that pixelflage could help the suit louie round up more Joeys because the bandits wouldn't know how close he actually was. "Yeah, I read that story," Angel said. "'Invisible Avenger.' Pretty good. 'Cept it's not like you're *really* invisible."

And there it was again. That curtain. "I *know* that," I growled. "I juice it a little for the civilians, is all."

"All it does is duplicate the landscape on your pixel array, so—"

My right arm twitched and knocked over an empty bottle. "I said, I *know* that. I went through the training with you. Got higher scores, too. If it hadn't been for the accident—"

Lyle looked at me. "An' we know *that*. Sure, you woulda been good. You woulda been hell on wheels. You woulda been the next Lieutenant Bellcampo, with medals down to your crotch, if you hadn't spilled on Jimmy's bike that night. But you did; so you're not; and it's *over*. We love you, man. You know that. We're the 'Fantastic Four,' right? But you can't change what happened. You just got to go on from where you are."

Jimmy reached out and touched me on the arm. "It's over for me, too," he said, but I jerked my arm away. Blame it on a spasm.

"I still don't understand that," I said.

Jimmy and I locked eyes for a moment. "I don't know if I can explain," he told me quietly, "if you never been Inside." I looked away and he touched my arm again. This time, I did not pull back. "No diss, man," he said. "Just word. I really don't know if I can make you feel what I felt." He looked at the others. "Don't know if I can make them feel it, either."

"Try us," said Lyle. "But the beer's gone; so—"

Jimmy shrugged. "Yeah. We're just swapping Inside stories, right? No big deal." He made a fist of his right hand and rubbed it with his left. "OK, so it goes down like this.

"I get as far as the spruce on the north edge of town, just where it gives way to open meadow around the creek. That puts me three jumps from the center of town and one jump from a herd of cows. There's a cowboy out with them. Don't know if he was a bandit or one of the regular townsfolk. Never did find out, and it didn't matter in the end. You lie down with dogs; you wake up with fleas.

"I put the walker on stand-by, so nothing moves. The pixels is all green and brown and black, so I blend into the forest behind me. The cowboy looks my way once or twice, puzzled-

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like, like he ain't sure he's seen something or not. Me, I got my 'nocs locked in on the big building, waiting for Badger to call the dance.

"I didn't have long to wait before I hear gunshots over my channel to Stoltz. Maybe they were loud enough to carry by air, because my cowboy, he frowns and peers south. Wild Bob's pickets call in for help and my Artificial Stupid locks in on their freq. Can't make heads or tails of the traffic, though, because it's all black . . ."

"Shoulda kept that kind of encryption illegal," Lyle said.

"Oh, yeah," I said. "Illegal. That would have stopped the likes of Wild Bob. Codes don't make conspiracies; conspirators do. Besides, PGE and other black codes were all over the Net. Might as well've made the wind illegal."

"And besides," Angel said, "the big corporations didn't like the idea of the government holding keys to all their codes. And they're the ones that call the shots."

Jimmy looked at him. "Yeah? That's what Wild Bob always said. Big corporations, Wall Street, the Jews. Besides, what do I care what Joey's saying, coded or not? It wasn't more'n fifteen seconds after Badger started the music that they come pouring out of that big building. They all have 'sault rifles and bags full of bananas. Two of 'em are lugging a mortar and some shells. I give Badger a heads-up over the aerostat relay and tell him what's coming his way.

"The cowboy decides either to join the fun or to head for home. He spurs his horse and goes galloping across the meadow. I take that as my cue and go into leaper mode. Anyone hears a noise, they look over and see that cowboy easier than they can see me. That gives me maybe another jump or two before the balloon goes up. Last jump put me right in front of the main building. The bandits usually don't post guards—they own the town's soul—but all the shooting has got them nervous. So there's a Joey standing around the front door with one thumb on his rifle's safety and the other'n up his ass. When I come down on the street behind him, he jumps like Old Shaq' in his glory days, and I chop him up before he even hits ground."

"What'd you use," Lyle asked. "Finger gun?"

Jimmy ignored him. "I bust through the front door and bounce from office to office, leaving little calling cards in each. The radio was in the third room. Some old bat was on the horn, hollering. When she sees me, she reaches in her desk drawer and pulls a .38. I don't have time for that crap, so I give her a spray and then shred the radio set."

"Think she got the warning out?"

"I know she did. But a suit louie never figures to go unnoticed when he's Inside. I work my way through the building—and pop a few more Joeys who want to field test their ammo. By the time I bust out the back wall, my little presents start going off and pretty soon the whole building's in flames. So you see, what did I care about the radio? *I* was the one sending the message. If she hadn't gone for the gun, she could've run with the others."

"Generous," said Lyle.

"Those were the Rules of Engage-

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ment, Style. Remember, the area was officially 'pacified.' I could shoot whoever came at me armed; but anyone else, I had to tranq, smoke, strobe, or leave alone."

"And decide which is which on a moment's notice," Angel commented bitterly. "All Joey has to do is not go for his gun and he's a peaceable citizen."

"So I guess I lucked out, because I don't think there were more'n two dozen folks there who *weren't* potting at me. Some heavy rounds. Armor piercing. One cholo had ramjet rounds. You know, with the discarding sabot and the jet core through its middle? They hit with a couple of Mach. My walker took some damage; and the blowback . . ."

"Oh, yeah," said Lyle, rubbing his arm. "The blowback."

"I had bruises for a week where the walker got knocked around. I mean, I know you gotta have feedback through your suit pads, otherwise you got no 'touch,' but I wish the dampers would react faster than the blowback from impacts."

"Better'n being hit by a round direct," I said.

Angel went, "Word up. Sprained my wrist one time when a mortar shell wrenched the manipulator arm on my floater."

"It's like having a spasm." Lyle looked at me. "You remember what it was like during live round training. Must be a lot like what you got now, right?"

I went "right" and didn't try to fine-tune his opinion. He wouldn't have believed me anyway. People have a need to reduce things to what they think they understand.

"I whipped that town's butt good," Jimmy went on. "Pretty soon, though, Wild Bob figures out that the possemen were just a decoy so's I could yee-haw, and the 'away team' come streaming back from the south pass on their ATVs and dirt bikes. Well, I'd already gotten the range for a couple of landmarks along the county road, and my submunitions were already in place. I watch my heads-up until the column reaches the right point, then I trigger my subs and let loose. Ducks in a barrel. I couldn't have done better if they'd all held still and said 'cheese.'"

Angel pumped his fist and went yee-haw.

"Pretty," said Lyle. Jimmy shook his head.

"It's never pretty. I went in to break them; so of course that's what I did. But it was a dirty business and I hate those sumbitches for making me do it. Wild Bob himself, he was still functional. He'd been bringing up the rear, in case Badger tried following him to town, and he hadn't taken a hit. My sensors spotted his bald dome flashing in the afternoon sun and I high-leaped right over to him. I bet that was one day in his life when he wished he had all his hair back. He sees me land and his face twists into a sneer. He's got a grenade launcher in his hands and the devil in his eyes.

"Now, he knows the Rules of Engagement like he wrote 'em his own self. And who knows? They way they tie us in knots, maybe he did have a hand in the drafting. So he knows if he drops the grenade launcher, I got to switch to non-lethal."

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Angel shrugged. "Me, I got slow reflexes."

"Yeah, well, it didn't matter, 'cause he didn't drop nothing except another grenade in the chamber. I opened a channel and give him his chance, saying, 'Bob, I come to take you in.' But he just curls his lip and goes how I ain't come anywhere and lobs a grenade at my optics."

"Hell," said Lyle, "that ain't nothing to swat away. Artificial Stupid can handle it on automatic."

"Sure, but the arm swing puts you off balance for a second because it's automatic; and that's the second when Wild Bob melts into the rocks. That forces me to run the instant replay so I can see where he went and follow him.

"We played peek-a-boo all across those rocks. He'd pop up and try another round, always going for the optics or the ee-em arrays. Oh, he knew power suits and where the weak points were. Then he'd scurry off to some new position." Jimmy shook his head and he looked at the wall, except he wasn't seeing the wall. "I'll give old Bob this much. He had sand. Not many folks'd buck a suit louie that way. Deep down, he believed in his cause. Had to, to do the things he did. He knew all along this day would come and he sort of looked forward to it, if you know what I mean. Maybe he even welcomed it. I thought about saving the county the expense of a trial—I had some HE in reserve and could have made some mighty fine rubble out of those rocks; but, strictly speaking, this was a police action, not military, and Badger hankered for a trial. He wanted the public to know how Bob wasn't some damned Robin Hood, but a murdering, thieving traitor. Last thing he wanted was a martyr and a folk-song.

"So Bob and me, we play cat and banjo for maybe fifteen, twenty minutes; and the more Bob backs away from me, the closer he gets to Badger and his posse. I thought maybe he didn't realize that because a firefight concentrates your attention, you know what I mean? But he knew exactly what he was doing. I call on him once more to surrender, and he goes, 'not to the likes of you.' And then, I swear, he hollered for Badger.

"'What do you want, Bob?' Badger asks him from behind the next rim; and he says, 'I want it to be you, not him,' and Badger goes, 'You sure you want it that way?' and Bob said he was sure. 'If a man gotta go down, it oughta be to another man. And Badger, you may suck the gummint tit; but you are, by God, man enough to come for me your own self.'

"So Badger he tells Bob to step out where he can be seen and hold his hands up. Maybe ten, fifteen seconds go by; then Wild Bob steps out from behind a finger of rock—which surprised me, because I had him pegged a couple meters the other way. He's still holding that grenade launcher. Badger—I can see him now, skylined on the rimrock twenty meters past Bob—he's got the high ground and a 'sault rifle. He says, 'Bob, throw down the launcher,' and Bob says, 'Now, Badger, you know I can't do that,' and the sheriff goes, 'Throw it down *now*, Bob!' and Bob doesn't say anything except he works the pump to cham-

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ber another round. Badger goes, 'I don't want it to end this way,' and Bob goes, 'Only way it could. Tell Ma and Natalie good-bye.' Then he raises the launcher to his shoulder and Badger sprays him with a cloud of fléchettes, which rip him up something bad, so I think he was dead before he knew it."

Lyle the Style shook his head and said, "Jesus." Angel crossed himself. Jimmy ground his fist into his palm, like a mortar and pestle, and didn't say anything for a long time. Finally, I spoke.

"They were brothers, Wild Bob and the Badger?" Oh, what a story that would make! If I could only find the right words to tell it. Duty versus fanaticism—with love ground to powder in the middle.

"I leaped on over," Jimmy said, "and grounded next to Badger where he stooped over Wild Bob. Badger looks up at me and says, 'It was empty.'"

"What was?" asked Angel.

"The grenade launcher," I said. "That's right, Jimmy, isn't it? Bob's weapon was empty."

Jimmy nodded. "I told Badger I'd carry the body back to town if he wanted. You know those walkers; they can carry a lot in their cradles. A single body wouldn't be much. But Badger just gives me a look and says if I want so bad to carry the body, I could damn well come up to Spruce Creek and pick it up my own self."

"Oh, man," said Angel. "Diss."

"What did you say to him?" I asked.

Jimmy shook his head. "I didn't say nothing. I yanked off my virtch hat and threw it to the floor. Lieutenant Serena asked me what I was doing, but I didn't pay her no mind. I just stared at the walls of the teep room, thinking."

"Thinking," said Lyle. "That's always a mistake."

Jimmy gave him a look, as if he were a stranger. "I left the teep room and checked an ATV from the motor pool. I know I left the walker out there untended—and the colonel chewed me a new asshole over that later on—but I had to go to Spruce Creek. Not just be telepresent. You understand? I had to be there myself."

"Dumb move," said Angel. "It's telepresent fighting waldoes helps keep down body-bag expenses."

"*Our* body bags," I pointed out.

Lyle shrugged. "Those are the only ones that matter to me."

Jimmy shook his head. "You're right, Angel. It was a dumb move. By the time I reached Spruce Creek, they were all gone. Badger and his posse. The bandits. Most of the townsfolk. Shit, most of the *town* was gone. Even the walker. Lieutenant. Serena had teeped it after I went Outside. So I got out of the ATV and retraced the path of the firefight, walking from rock to rim. I had cornered Wild Bob *there*. He fired his last grenade *there*. Badger shot him *there*. The rocks were all splashed red; there were shell casings and sabots all over. I don't know how long I crouched where Badger had crouched. If any of Wild Bob's friends had still been around, I would have been easy pickings. Finally, a squall blew up and I hiked back to my vehicle and pulled up the clamshell. I sat there for a while listening to the high country wind. After a while, I drove back down to the firebase."

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"And after that," I said, "you put in your papers."

Jimmy nodded.

"For the ATV/horse cavalry."

Another nod.

Angel said, "I still don't get why."

I leaned forward in my chair. My arms on the armrests barely trembled. "It's because it wasn't a fair fight."

Lyle grunted. "It wasn't *supposed* to be."

Jimmy raised his head and looked at me. "It's not that."

"Then what?" I asked.

Lyle laughed. "It's because he wants the respect of that hick sheriff. Or his daughter."

Jimmy rose from the floor. "I didn't think you'd understand." He looked at me. "Though I hoped *you* would."

We locked eyes for a moment. Then he turned to go. When he got to the door, I blurted out. "Oh, Jesus. It's Wild Bob's respect you want."

Angel scowled. "That hemorrhoid? What's *his* respect worth?"

Jimmy paused with his hand over the doorplate. "What he believed in was all wrong and twisted," he said. "But he was willing to die for it. If what we're fighting for is right, shouldn't *we* be willing to risk something besides equipment damage and feedback bruises?"

When he had gone, there was silence in the room. Lyle and Angel and I looked at one another. Finally, Angel said, "He's nuts. You don't fight snakes by wriggling in the dirt and trying to bite 'em first. That doesn't make you brave, just stupid. You stand back and blow 'em away with a sweeper. Only one way to end this fighting. Stomp hard and stomp fast."

Lyle shook his head and said, "He'll get over it. It's just syndrome."

"Well," said Angel, "he'll find out there's a hell of a difference between teep fighting and fighting in person."

"Maybe," I said, "he already found that out."

That was the last I saw any of them until after the big offensive. Angel and I shared a platform at a bond rally, but that was near the end, when Angel was the Hero of Boise. We'd both heard how Lyle—and half his firebase—got scragged by the Sacramento car bomb and after the ceremonies we emptied a couple of Skull Mountains for him. That's when Angel told me that Jimmy Topeka lost an arm in a firefight in the Bitterroots. He's married now and living in the high country.

I managed to etch a half dozen stories out of that one day's bull session. "The Brothers." "Rules of Engagement." You've read them. They were compiled on ©-Net at <The Insiders> website.

The funny thing—and it must be just a coincidence—is that ever since then my seizures haven't bothered me so much.■

Sometimes the delete key is your best friend.

—Steve Martin

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Forever Peace, Joe Haldeman, Ace, $21.95, 326 pp. (ISBN: 0-441-00406-7).
Finity's End, C. J. Cherryh, Warner, $22, 471 pp. (ISBN: 0-446-52072-1).
Diaspora, Greg Egan, HarperCollins, $?, ? pp. (ISBN: . . .).
Faraday's Orphans, N. Lee Wood, Ace, $13, 294 pp. (ISBN: 0-441-00446-6).
A Hunger in the Soul, Mike Resnick, TOR, $?, ? pp. (ISBN: 0-312-. . .).
Earthquake Weather, Tim Powers, TOR, $24.95, 414 pp. (ISBN: 0-312-86163-X).
Saint Leibowitz and the Wild Horse Woman, Walter M. Miller, Jr. (and Terry Bisson), Bantam, $23.95, 434 pp. (ISBN: 0-553-10704-6).
Destination Mars: In Art, Myth, and Science, Martin Caidin and Jay Barbree, with Susan Wright, Penguin Studio, $29.95, 228 + xii pp. (ISBN: 0-670-86020-4).
Murder in Space, E. C. Tubb, Gryphon Books (P. O. Box 209, Brooklyn, NY 11228-0029), 184 pp., $20 pb (ISBN: 0-936071-89-3), $40 hb (ISBN: 0-936071-907).

It is time to repeat myself: Because of the nature of this magazine and its publishing mechanics, I write these reviews about six months before you see them and eight months before the date on the cover (I'm starting this March column on July 31!). The books I review have been awaiting my attention for weeks and sometimes months. Some of these books are bound galleys and "advance reading copies" (sometimes "advanced reading copies"), which will be published in a month or so (in, say, September). Some are hardbounds and paperbacks that were published a month or so ago. In both cases, my reviews appear long after the book has vanished from the shelves, though you may still be able to have your bookstore order it (or you can order on-line—try http:// www.amazon.com—often at a discount).

It would be nice if the reviews could come out about the same time as the book. They could then help you decide what to buy while you can still find it. They could also satisfy anxious authors. They could even give publishers quotes to use in their advertising. But alas, that just can't happen.

Except sometimes. In this column, you will find two books—Resnick's and Egan's—that are scheduled for publication in February and March of 1998. These two authors are among the very few who noticed my previous rants on this topic and took me up on an invitation: authors who want timely reviews should not wait for their publishers to send me galleys or books.

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They should themselves send me a manuscript—paper as Resnick does, or disks (MS-DOS) as Egan and Jeff Carver do—as soon as the publisher has accepted and scheduled the book.

I hereby renew that invitation. If you want to send disks, though, put your files in ASCII (text) form or check with me on word processor compatibility. Necessary contact information is in the SFWA Directory.

Joe Haldeman made his fame with *The Forever War* over twenty years ago. That book's theme—the stupidity of war and the need to end it—was one he returned to later, with *Tool of the Trade,* which saved the world for peace with a very unlikely mind-control gimmick. Now he tries again, with much better success.

Forever Peace posits a war between the haves (the rich, industrialized West) and the have-nots (the Less Developed Countries), called the Ngumis. The haves use "soldierboys," nearly unstoppable machines controlled by "mechanics" sitting in little rooms hundreds of miles away, their brains plugged into teleoperation systems for ten-day shifts. The mechanics of a single platoon are also plugged into each other, so there is something a lot like telepathy here, and platoon members tend to get pretty close.

Society is complicated by the "Enders," a cult that believes the end of the world is coming, and should not be stopped. (Perhaps the term is a bit of homage to Orson Scott Card's Ender Wiggins, who also fought a war by remote control.)

Meet Julian Class. In his twenty-day off-shifts, he's a university physicist, teaching and researching. On duty, he's pretty stressed, even to the point of contemplating suicide. But then he gets involved in calculating the consequences if the Jupiter Project (a vast, nanotech-assembled particle accelerator) succeeds in recreating the conditions of the Big Bang. The resulting paper—with its recommendation to shut down the project immediately—is squashed and government goons come hunting. A friend reveals that mechanics are limited to ten-day shifts for a reason, and Class wonders what would happen if platoons could be made much larger.

And that's enough clues, class. The gimmick seems much more likely than that of *Tool of the Trade,* the threat to All We Hold Dear is a doozy, there's more than a hint that the reason peace is hard to achieve is that there are groups who want destruction, and Haldeman does a fine job of putting it all together as a lively page-turner with a noble motive and a feel-good ending.

Being the battered cynic that I am, I don't believe it for a moment, but that's OK. It's still a great yarn. You'll enjoy it.

Peace is also the theme in C. J. Cherryh's **Finity's End**. The title refers to a grande olde dame of a merchanter ship which, under its still-captain James Robert Neihart, did so much to establish Cherryh's universe of Earth and Union, stations and merchanters. It has long played a major part in the War. Lately it has been hunting pirates and Mazian's renegade Fleet. Now it is

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ready to leave war behind, to become a civilian trader, paying all tariffs and duties and decorously forswearing the black market.

But first it must tie off at least one loose end. Merchanter ships are crewed by Families who must breed their own replacements. During the War, few babies were born, quite deliberately, and *Finity*, like many another ship, lost a large portion of its crew. It can't make up the loss, or the lost breeding opportunities, but it had had to put one of its women ashore at Pell Station, too pregnant to stand the rigors of battle. It would be back in a year, it said.

Except it wasn't. War kept it away, while a boy, Fletcher Neihart, was born and his mother turned to drugs and eventually died of an overdose. Fletcher grew up unwanted, bounced from foster home to foster home, rebellious, a problem child. Yet he was smart enough to seize opportunities as they came his way. Now he is in a Planetary Studies program, stationed on Downbelow, friends with the only two people who have ever loved him, the natives Melody and Patch.

Now *Finity* is back, ready at last to reclaim its misplaced lamb whether he likes it or not. And he doesn't. He's pissed. He's been rejected at every turn, manipulated and mistreated and never given chance one, and who the hell are these godforsaken merchanters anyway? Family? What's that, besides another excuse for rejection? (Remember—Mama killed herself.)

In other words, Fletcher-boy has a very large chip on his shoulder. He does *not* trust the big welcome. He does *not* like his initial scut-work duty assignment. He does *not* want to go gallivanting off across the galaxy just when he had begun to bring a life together. And when someone steals the hisa spirit stick he had brought with him from Downbelow, that is the very last straw. It's a big job, growing up, becoming civilized, and Fletcher nearly doesn't make it.

Meanwhile, Captain James Robert has revealed what *Finity* is up to: Creating a lasting peace, bringing stations and merchanters, even the rogues, together under a rule of law that must forever exclude the pirates and Mazianni. Two tasks, then, civilizing an individual and a universe. And spirit sticks, says the hisa myth, have a way of going where they are most needed.

Cherryh may seem to go on a bit much about Fletcher's teen-age angst, but she keeps things happening and the reader keeps turning pages. She makes it all work very nicely. This is an admirable addition to the Cherryh opus.

When Greg Egan sent me **Diaspora**, he assured me it was very different from his last, *Distress*. It was, he said, "sort of a space opera for AIs."

Except it isn't, really. There are no villains for space-suited posses to head off at the passteroid, no silicon sheriffs, no prostibots with chips of gold at their hearts. What there is instead has much more in common with Olaf Stapledon's grand sketches of the future, for it too limns the future history of humanity—or *a* humanity.

Unfortunately, like Stapledon, Egan also delivers himself of vast expository

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lumps as he explains physics and math and the multi-dimensional nature of the universe. These lumps are well enough done, and they are crucial to the tale, but they surely limit the appeal of the story to those who like their SF hard.

What's the story? The time is centuries hence. Humanity exists as the "fleshers," who reside in small numbers on Earth; some look like us; some show extreme genetically engineered changes. There are also the "gleissners," or robots, and the "polis citizens," software entities that debate the virtues of remaining tied to physical reality or escaping to completely virtual realms. There are rivalries among the three types, and different senses of mission (the gleissners are building stl starships to go exploring), but fleshers and gleissners can become citizens and citizens can become gleissners.

Egan's focus is on the citizens. He begins with a hint of vast time and space, saying his chief character, Yatima, will follow a group called the "Transmuters." The reason is inherent in Yatima's origin as an orphan and here is why: And here is Yatima's origin as a parentless "orphan"kindled from a mind seed in a software conceptory, embryogenesis, development, birth, and initial gropings at the world. Friends and adventures, the discovery by a gleissner astronomer of an incipient catastrophe, the attempt to save the fleshers, a failed attempt to exploit subatomic wormholes for ftl travel, an stl voyage to a distant world where Yatima and friends discover a message from a long-vanished people (those Transmuters) that the Galactic core has exploded and a wave of radiation will soon destroy everyone, and the discovery that it is possible to follow the Transmuters into other dimensions of the universe.

This is all interesting enough as hard SF, but Egan's core message is perhaps even more interesting. Yatima is one of those few who push beyond the boundaries, an explorer, an adventurer. When this becomes clear to his (Egan says "vis" to indicate gender is not a factor) polis's reproductive machinery, his defining codes are deleted from the "gene pool." Yet it is precisely those codes that make it possible to save a portion of humanity from catastrophe, that make it possible for Yatima to climb a sort of Jacob's Ladder toward the heights of heaven, and if he thereby loses touch with all his fellows, all his roots, there are still the glories of reality, knowledge, infinity, mathematics. Ever onward is the moral, ever upward, reach always ahead of grasp, and damned be him who first cries, "Hold, enough!"

N. Lee Wood made an excellent first impression with *Looking for the Mahdi*. In some ways, her latest, **Faraday's Orphans**, is better, for she shows a deft hand in her portrayal of a world struggling back from the destruction consequent upon a magnetic field reversal, large portions turned to desert where the influx of solar radiation has blasted plant life into dust, humans reduced to savagery except where they have clung to civilization beneath great domes, such as the

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ones that cover Pittsburgh. Here we meet Berk Nielsen, a helicopter pilot who refuses to join the City's corps of fixed-wing flyers; he is not a team player. Indeed, he seems happiest far from the City's politics, quite delighted when he receives permission to search the Philly ruins for reserves of needed oil. But when he camps out atop a skyscraper for the night and is attacked by a pack of feral children, his happiness is lost. So is his chopper, and almost his life. Fortunately a local maiden, Sadonya, pretty feral herself, chooses to heal his wounds, feed him crispy-nuked rat, and enslave him. In due time, they escape Philly and head for the Pittsburgh domes.

But though Wood has crafted a story that is convincing on several levels, her work suffers from three major flaws. The first is the disaster that created the novel's world; as a biologist, I find it difficult to believe that a field reversal would have such effects, since there is little evidence of similar effects with past reversals. The second is that though she is presenting Berk as a self-centered non-team player, she periodically drops Sadonya so completely—to the point that she is not even background—that the reader wonders what has happened. Third, the ending—which I won't detail—struck me as arbitrary and incomplete, possible only for a Berk who could not possibly have behaved as he did when a captive in Philly.

We can't have everything, I know. But this one lacks too much.

Mike Resnick's latest parable from the Galactic Frontier tells us that "nice isn't a survival trait." It's also not the way to get famous: "If you walk the path to greatness, you're going to have to make decisions and commit actions that might be repugnant to normal men." To seek greatness, "you've got to be more than successful. You have to be *driven*. You've got to have" **A Hunger in the Soul**.

The narrator is an ex-explorer who lost a leg on Bushveld, retired to a museum post, and has eaten his fill of discontent. Into his office one day steps Robert Horatio Markham, a journalist who seeks the sensational, plans to be rich and famous, and is setting up a trip to Bushveld to hunt down a missing miracle doctor, Michael Drake, who just may have the cure for a plague that is ravaging the worlds of Man. He wants the narrator to be his organizer, he'll pay very well, and he has no trouble at all in signing the man up. And yes, of course, Markham is playing journalist Stanley to Drake's medical missionary Livingstone.

To Markham, what comes first are mission and efficiency, fame and photo-op. Whatever interferes—injury, desertion of native porters, uncooperative local natives, nasty weather—is brushed ruthlessly aside, while the narrator tsks and tuts and finally must decide whether civilization needs people with such soul-hungers despite the damage they do.

How does the narrator call it? Does Markham find Drake? Does Drake have the long-sought plague cure? Read the book and find out. It's not long, it's a fast read—count on Resnick for that, as well as a heavy dose of irony—and you'll enjoy the tale.

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* * *

Tim Powers's *Expiration Date* was a remarkably strange and tasty bit of surrealism that told us of a world where eleven-year-old Koot Hoomie Parganas, raised to be a holy man, could be ridden by the ghost of Edison and pursued by avid ghost-eaters. It ended with Kootie safe and the ghost-eaters defeated, but the tale was not yet done, for now we have **Earthquake Weather**.

This sequel opens two years later, with the murder of Scott Crane, the Fisher King, representative of Dionysus, by Janis Cordelia Plumtree, a woman with more than her share of personalities, and Janis's capture by a psychiatrist who eats his patients' madnesses and rewards himself with a bit of rape on the side. In the same locked clinic is Sid Cochran, vineyard worker, scarred in childhood by the god of the vine; he lost his wife recently and has been hallucinating bullheaded men in the streets.

Or has he? This is surrealism, after all, and Kootie is still around, discovering signs and portents before a truck appears in the street outside his home with the Fisher King's uncorrupting corpse aboard. Must Kootie succeed to the throne? Can the King be restored to life? There are ancient cults and hippies and ghosts in play. Janis's dad craves to be the Fisher King himself, though he was thrown off a roof when his daughter was only two. The psychiatrist, Dr. Armentrout, wants the Fisher King flat-lined brain-dead and on life-support so that he can pursue his vices without interference. Cochran wants Janis even though her multiple personalities throw off sparks galore. The vine god Dionysus has an agenda too, and the phylloxera root louse that destroyed the European vines is of concern as well.

It's a complex brew, worked out at length, and rescued from confusion only by Powers's awe-inspiring talent as a literary juggler. Don't miss if you like either Powers or surrealism.

Terry Bisson's name does not appear on the cover, but it should. Without Bisson, the novel the late Walter M. Miller, Jr., left behind when he died in 1996 would never have seen the light of day. Fortunately, that novel—**Saint Leibowitz and the Wild Horse Woman**—was nearly complete and Bisson was able to follow Miller's instructions to finish it up.

Saint Leibowitz and the Wild Horse Woman is typical Miller in that it is deeply concerned with religion, but if you are expecting it to be a repeat of Miller's one previous novel, the famous *A Canticle for Leibowitz* (1960), for which Miller remains best known today, you will be disappointed. The setting is a Leibowitzian monastery in the fourth millenium southwestern US. The holocaust that destroyed our *magna civitas* is long past, background. A new *magna civitas* seems not too far off, for technology has reascended to the level of electricity and repeating rifles and revolvers.

Meet Brother Blacktooth, a discontented monk who wants to renounce his vows and return to the world. He gets his chance when Cardinal Brownpony takes him as aide into a realm of Nomad horse-warriors (apparently

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half Amerindian, half Mongol horde), papal conclaves, mutant refugees, and gun-running. Schemes are afoot to return the Church from exile to New Rome, to defeat the Texark tyrant, to unite the hordes, to liberate the mutants from oppression, to put Brownpony somewhere near the top of the holy hierarchy. Yet Blacktooth has something else on his mind: He has met Aedrea, daughter of mutants, marvelously mischievous, marvelously tempting, mystically linked to a Maiden of Nomad folklore. Events conspire to separate them, but the monk is obsessed through all his further adventures and visions and nightmares, civil and military, until eventually, after he has found a calling and peace. . . .

Saint Leibowitz repeats a number of themes—Catholicism, monasticism, religious vocation, mysticism—Miller dwelled upon during the ten years of active writing that culminated with *Canticle*. To my mind, however, it does not live up to expectations raised by its predecessor. It's wordy and slow and provokes few thoughts that have not been provoked by too many other SF and fantasy epics over the last four decades. It breaks too little new ground.

On the other hand, it compares very well indeed to many of those epics. If *Canticle* had never been written, *Saint Leibowitz* would succeed nicely on its own.

The late Martin Caidin's (1927-1997) last book is **Destination Mars: In Art, Myth, and Science**, a rather nice and very timely coffee-table survey of the human obsession with the Red Planet, richly illustrated with ancient and modern artwork and photos, stopping just short of Pathfinder's and the Sojourner rover's latest snapshots.

If you want depth, don't look for it here. This is the once-over-lightly, with pictures. As a survey of an obsession, it begins very appropriately with Orson Welles's 1938 *War of the Worlds* radio broadcast, whose astonishing impact can only be explained by a willingness to think the worst of Mars, fed by the planet's long association with the god of war. That association is here in full, but so are the canals of Schiaparelli and Lowell, the science fiction of Burroughs and others, the science of Mariner and Viking. The Face at Cydonia gets a mention (and a photo). So do future prospects for robotic and manned missions, and even the possibility of terraforming.

A nice gift for a fan.

The avid collector can find half a dozen SF-murder tales by E. C. Tubb in **Murder in Space**. They provide an interesting glint of illumination on the changes that have come to SF in . . . Gee, in just the years since I started reading the stuff in the late fifties. The bulk of SF then was much simpler, even cruder, not very subtle, and these stories by Tubb are no exception to the time in style and voice. Nor would a one of them have a chance for publication today, except in the small press amateur market. ■

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BRASS TACKS

Dear Stan,

In the September "Brass Tacks," Howard Mark defends Isaac Asimov's psychohistory—the possibility of social engineering that really works—against my remark that chaos theory shows it's unattainable. Dr. Mark says, quite correctly, that given large enough numbers of units, their individual fluctuations will average out; and so, for example, while the movements of single molecules in a gas are unpredictable, the gas laws are exact.

Well now, let's rather extravagantly assume the Galactic Empire contains ten billion inhabited planets with an average population of ten billion people. I don't see how any sizable fraction of the resulting number would be governable by any power this side of God Almighty, but never mind. The point is that we're still three orders of magnitude short of Avogadro's number. There are as many humans in the Empire as there are molecules in perhaps ten cubic centimeters of Earth's atmosphere. This is supposed to give us an analogue to the weather? Dr. Mark admits that we can't really be certain of anything about that except a few large generalities such as that summer is always warmer than winter (which wasn't even true in the year 1816). Although our forecasting techniques nowadays are pretty good, they are not always to be relied on, and never for more than a few days ahead. Meteorological phenomena are nonlinear.

And humans are a great deal more complex than gas molecules. True, we can find some statistical regularities; insurance companies depend on it. And certain historical patterns have a way of repeating, especially when they're mistakes. Kipling's poem "The Gods of the Copybook Headings" describes this about as well as anybody ever has. But none of this helps us predict or control actual events. The individual who dies isn't just a statistic, he or she has been a person, affecting the world in unique ways, sometimes very important ones. The particular mistake that gets made at some given time, and the particular form it takes, are unpredictable, but the course of history can be drastically affected.

Science fiction has seen plenty of "what if" stories developing this point. Several of them are quite plausible. And indeed, Asimov himself described, rather early in the Foundation series, how random events were bound to wreck Seldon's plan sooner or later, unless it provided some behind-the-scenes control and correction factor stable enough to hew to

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the purpose for century after century.

Those stories are very rightly considered classics in our field. Besides being highly original and highly entertaining, they provoked a lot of thought. They still are and they still do. But I'm afraid the basic concept is of a piece with the faster-than-light spacecraft that are also involved.

POUL ANDERSON

Dear Dr. Schmidt,

Shades of Mario Cuomo. The temptation to flame you and correspondent Clint Harman is almost overwhelming, but I think, as an *Analog* reader and subscriber of more than 40 years, I can appeal to your sense of fairness and accuracy. The subject is not your editorial, but the letter you published containing a pejorative reference to "NRA-type gun nuts." This is as insulting to me as if you published a letter containing a reference to my ethnic heritage as a stereotype for violent behavior.

The letter as published lumps violence, misery, and gangs together with the NRA, an organization I have been a member of for almost as long as I have read *Analog*. The NRA has a long and proud heritage of providing safe and competent firearms training for the citizens of the United States. The NRA is deeply involved in the struggle to balance our individual right to keep and bear arms, as law abiding citizens, with the effort to control criminal access to weapons, of any kind.

I am sure you know that I could go on, but in the interest of brevity, let me just ask that you editorially apologize for publishing this blatant and unwarranted slur against this organization and its membership. Mr. Harman's opinion is his, and he is welcome to it, but *Analog* should not be the vehicle for dissemination of it, particularly if that opinion is inaccurate and insulting.

JAMES F. LONGLEY
jiml@compuserve.com

My personal view of the NRA is closer to yours than to Mr. Harman's, but I cannot apologize for publishing his letter. It was to express his *views, not mine; and if his views include that attitude toward the NRA, wouldn't you rather know it than have the fact covered up by editorial tampering to insure "political correctness"?* Analog*'s letter column has been an open forum for a very wide range of readers' opinions, and to actually serve that function, it must express those opinions with no more tinkering than absolutely necessary. In general, we'll insist on a change if and only if somebody says something very clearly wrong in a strictly factual sense, or actionable in a legal sense. Otherwise, we insist on printing what the writer actually wrote. Mr. Harman had his say, and now you have yours—in each case, in your own words, not ones that were forced upon you.*

Dear *Analog*,

I would first like to say that *Analog* is the only magazine I have ever read in which I enjoy reading the editorials as much or more than any other part of the magazine (with the possible exception of the "Probability Zero" stories). Generally, the most disagreement I have had has been a "good points but I'm not quite fully con-

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vinced." However, the September editorial disappointed me. Not that I disagree with you. I just find it a sad state of affairs that you even feel the need to say something that is so incredibly obviously true. Unfortunately, I hear things all the time from people about this that I can all too easily understand why you felt urged to write about it. I just find it a sad commentary on current thinking in general society.

JOE DANIEL

Dear *Analog*,

I've seen several comments on the school system, and how and whether to improve it. One suggestion I haven't seen seems a natural, given current technology and computer communications development, but I haven't seen a word about it. Seems to me SF fandom is likely to contain *someone* who could do something with the idea, in real life, not just a story, so I thought I'd mention it to you. If it sounds to you like a good idea, perhaps you'll pass it on to your readers and maybe someone will find a way to *do* it.

The National PTA has something called a Master Teachers program in which exceptionally good teachers at all grade levels up through college get recommended by students and parents, get checked to see if they live up to what is said of them, and get recognition for exceptional skills in communicating the subjects they are teaching to their students.

I believe I had a Master Teacher for a geology course I had in college back in the sixties. Partly because while I'm *not* good at science classes, that one stuck. I still remember things from it.

If teachers that good were put on videotape, which was then made available via websites, perhaps as a kind of shareware or something, other teachers could use those tapes in their classes, or they could be used in home study programs, to supplement textbooks and such. Thus many students could get the benefit of the skill a Master Teacher has in presenting material memorably.

Websites could also be used to offer information for home schooling programs, where parents untrained as teachers try to substitute for a school without the knowledge, for whatever good reasons they may have—including unsuitability of schools in their area as places for children to be in. I have faced that problem myself. At the time my son and I could not afford to move. I had the choice of sending my son into a battleground where second graders carried switchblades, or trying to teach him at home. I had great difficulty finding information on even what subjects were expected to be taught for a given grade level. By the time I got the information I needed he'd missed a semester of work.

Surely websites could, and perhaps *do*, exist to provide information like that, and on sources of textbooks and such. And couldn't Master Teachers be made available to all that way? Where the school environment is a hazard to a child's well-being, or when a child is ill and will be for an extended time, or even when a teacher is having trouble getting through to bored students and could use the help of an expert presentation to kids who are more likely to pay attention to a

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video than to them anyway, videos by Master Teachers could be a major benefit.

I believe the technology to present them directly on the web, downloadable even, exists. Even for those who don't have the ability to do that, a website could permit them to order and buy such tapes. And a few guidelines could make a world of difference to parents, and even some teachers.

MARJI HOLT

Dear *Analog*,

What the devil happened? Usually your covers reflect your feature story, or perhaps a Science Fact article. This one doesn't seem to reflect any even peripheral facet of *anything* in the magazine. To make matters worse, it would appear that there is one heck of a good story to be associated with the picture. Where does one find animals that look like a cross between an African lion on hormones and an armadillo anyway, let alone warplanes that look like a cross between a Batmobile and a WWII fighter? Whatever one of the air crew is using on the "lion" is sure to just get his (unwanted) attentions.

As for your editorial, your comments about animal breeding really say just about everything meaningful that anyone could say. It is arrogant in the extreme (as well as unscientific) to believe that different rules apply to humans than to animals, and one has only to look at the extremes of dog sizes and dispositions to realize that there are some things environment just cannot change, while some environments will give a narrow range of results with *any* subject.

Have you read *The End of Racism* by Dinesh D'Sousa? He points out that much of what one group dislikes about another is in reality a cultural difference, not a racial one. I have no doubt that there really are racial differences between groups of people, just as there are wide differences between breeds of dogs. But it is still unproved what the real nature and extent of those differences might be. I think it is very interesting to consider things like the woman, a Polish Jew, who was great grandmother (I don't remember how many generations back) of *six* Nobel prize winners. What is the statistical probability of such an occurrence in *any* subset of the human race? Likewise, what is the probability of any member of some head-hunting tribe becoming a Nobel laureate in medicine or physics? They probably are about equal numbers. But to say that either racial group is smarter or harder working requires a lot of supporting evidence that may be lacking. To show that their cultures have made life better or worse for their people though is easy. Of course, it requires agreement on what is "good" or "bad"—in itself no easy task with some people. Most people would agree that it is better to live in conditions where children have virtual certainty of growing up healthy and well nourished, but some would say they are better off living in a family where they are loved and attended to by their mother, even if they do die from disease at age 8. There is no one answer, as you point out, that everyone will agree on.

HARVEY BELLAMY

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While our covers often *are based on the lead story or article in an issue, we have always used occasional "standalone" covers. The September cover was one of those, and we're currently using more of them than at many times in the past. It's usually easy to tell the difference: usually if the cover illustrates a story or article, the title of that piece appears first in the cover lines. On a "standalone" cover, usually, only authors' names are listed.*

Dear Mr. Meisner,

Thank you for an excellent article on "Cosmological Darwinism," in the Nov. 1997 *Analog*. As a non-physicist techie, I appreciated the whole discussion, pros and cons. Perhaps the biggest problem in finding a root cause for the Universe is that we emotionally want there to be a root cause. I certainly don't like the "It's elephants all the way down" kind of explanation.

Even those who bend toward the Deity root cause have a problem, namely, how did the Deity come to be? The "unknowable nature" resolution is one of faith, and for purposes of the kinds of discussions, equates to an I-dunno-and-can't-speculate-further worthless answer.

So, what if there is no root cause? Do quantum black holes and wormholes and potential time travel suggest that maybe Smolin's Foundation Universe, by repeated attempts created Progeny that finally procreated the founder?

Yuck. I still want a root cause. The accidental clump of something that aggregated and expanded into space-time. The initial pebble that started the avalanche.

For the layperson, I highly recommend the *Scientific American* website's discussion of wormholes and time travel.

RICHARD VIREDAY
richard@vireday.com

Dear Dr. Schmidt:

It was August, 1969. I was fifteen, waiting in the lobby of the Calgary airport to board a plane to Regina and spend an excruciatingly boring weekend with my sister and brother-in-law. While waiting, I wandered into the newsstand and confectionery. There, I began a lifelong love affair by purchasing my first *Analog* magazine!

The cover (I still have it!) features Tyrannosaurus Rex (or a reasonable facsimile) with a blue-skinned alien in its clutches while a human aims a bazooka-like weapon at it from below. Strangely I can even vaguely remember the storyline from the cover story: "The Teacher" by Colin Kapp. By the time I had read the entire magazine from cover to cover, the weekend was over and I was hooked. I did not miss an issue from that point on until 1981 when things got a little screwy both with the magazine—as I'm sure you'll recall—and with my personal life which I won't go into.

I began buying *Analog* again in 1985 and have managed to fill in most of the gap from used bookstores. I am happy to say that the current publication is every bit as good as the original. Every month I look forward to its arrival in my mailbox. Thank you for carrying on in the fine tradition of Messrs. Campbell and Bova. It says a lot about *Analog/Astounding* that you are only the third to occupy that office in over sixty years.

C. R. GUGINS ■

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UPCOMING EVENTS Anthony Lewis

27 February–1 March 1998
CON-DOR (southern California SF conference) at Town and Country Hotel, San Diego, CA; Guest of Honor—Harry Turtledove. Info: Con-Dor, PO Box 15771, San Diego, CA 92175; email: dkeais@aol.com; URL: http://users.aol.com/sdcondor/condor.html.

18–21 March 1998
INTERNATIONAL CONFERENCE ON THE FANTASTIC 1998 (academic SF conference) at Airport Hilton, Ft. Lauderdale, FL; Guest of Honor—Peter Straub; Special Guest—Lois McMaster Bujold; Perennial Special Guest—Brian W. Aldiss. Info: IAFA, College of the Humanities, 500 NW 20 HU-50 B-9, Florida Atlantic University, Boca Raton, FL 33431. (954) 475-6747.

20–22 March 1998
LUNACON 98 (NYC area SF conference) at Rye Town Hilton, Rye Brook, NY; Guest of Honor—Octavia Butler; Artist Guest of Honor—Donato Giancola; Fan Guests of Honor—John & Perdita Boardman. Info: Lunacon '98, Box 3566, New York, NY 10008. email: lunacon@lunacon.org. URL: http://www.lunacon.org/lunacon.html

27–29 March 1998
I-CON '98 (Long Island areas SF conference) at SUNY at Stony Brook, Stony Brook, NY; Guest of Honor—Norman Spinrad. Info: I-Con '98, Box 550, Stony Brook, NY 11790; (516) 632-6045; URL:http://www.iconsf/org/

5–9 August 1998
BUCCONEER (56th World Science Fiction Convention) at Baltimore Convention Center and nearby hotels, Baltimore, MD; Guests of Honor—C. J. Cherryh, Milton A. Rothman, STANLEY SCHMIDT, and Michael Whelan; TM—Charles Sheffield. Registration until 30 September 1997—$110 (£80); supporting $30 (£22); children +4 to +12 $55 (£40), children 0.75 to 4.0 FREE (all ages as of 5 August 1998). [These are the latest posted rates as of the time this column went to press.] This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Info: Bucconeer, Post Office Box 314, Annapolis Junction, MD 20701. Email: baltimore98@access.digex.netWeb page: http://www.access. digex.net /~balt98

Convention runners: If your convention has a telephone, FAX, email, or Web page URL, please let us know so that we can publish this information.

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